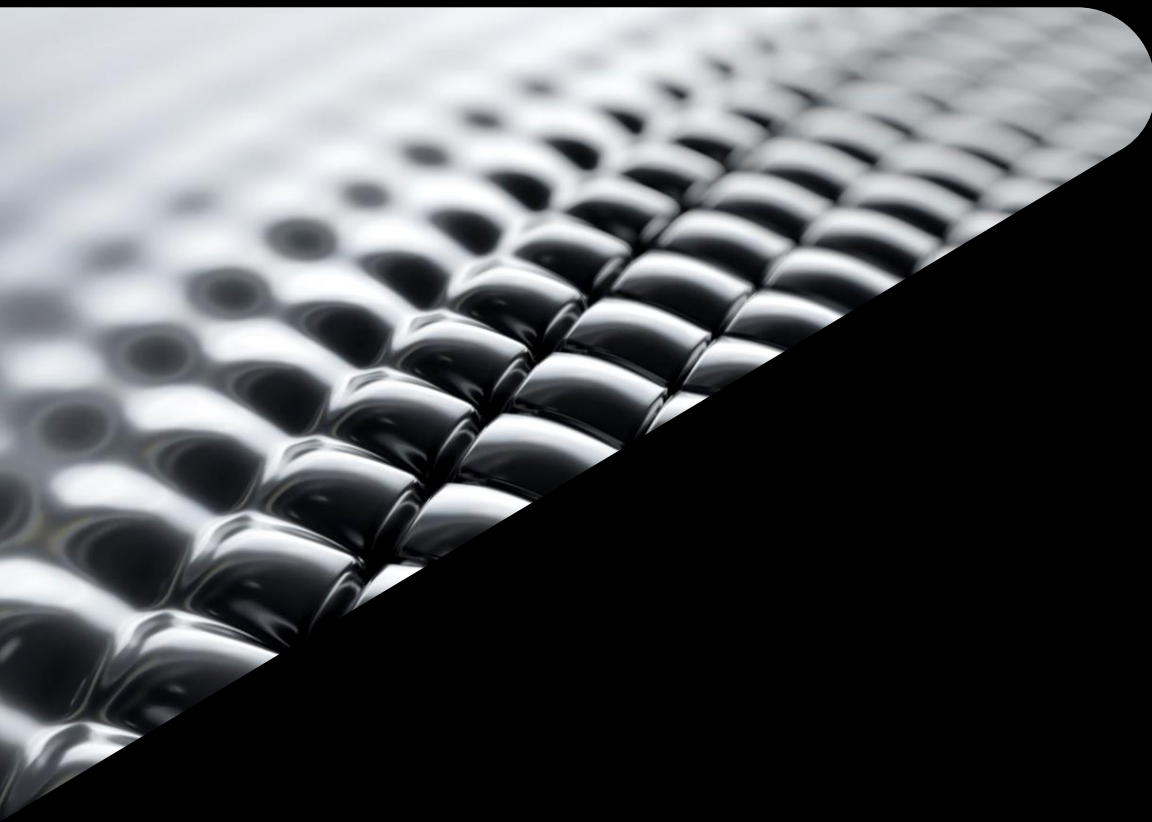




How Model-Based Workflows Counteract Higher Costs and Labor Shortages

Mark Harrison
Senior Sales Manager |
Harrison@americanprogressgroup.com





Presentation Goals

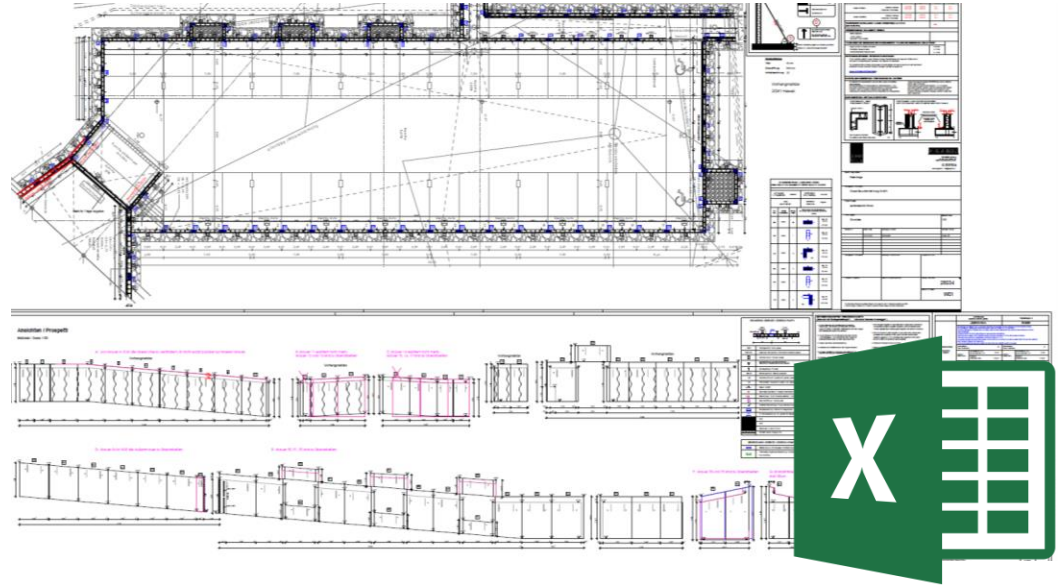
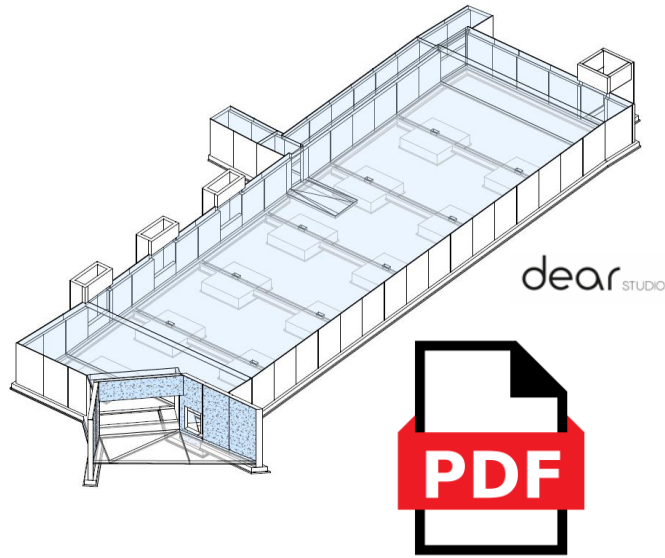
Learning Objectives

- **Learning Objective 1:** Learn how to enable “Freedom in Design” and “Automation in Fabrication.”
- **Learning Objective 2:** Learn how to improve workflows by using a model-based approach and creating digital twins.
- **Learning Objective 3:** Learn how first movers benefited from Model2Fabrication and our solutions.
- **Learning Objective 4:** Receive input that can help you benefit on your own with easy steps, without radical changes, and in less time than you thought.

Today's Challenges

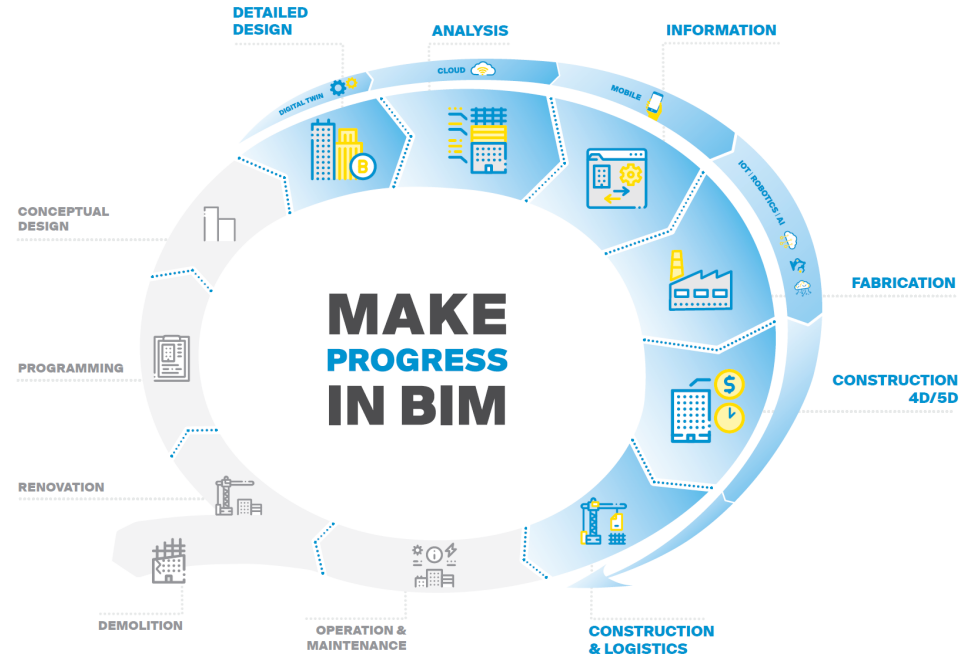
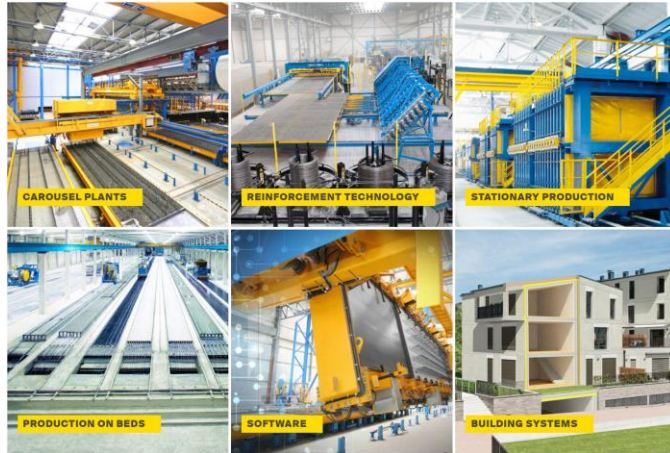
Complexity with Non-Model-Driven workflows

- With today's workflows mainly based on **PDF**, **Excel**, ... the ongoing trends of increasing costs of goods and labor shortages will not abate.



Today's Innovations

- Current trends in Modern Design provide readily available highly detailed models, technologies
 - e.g. BIM and innovative automation in fabrication would deliver solutions to this issues.

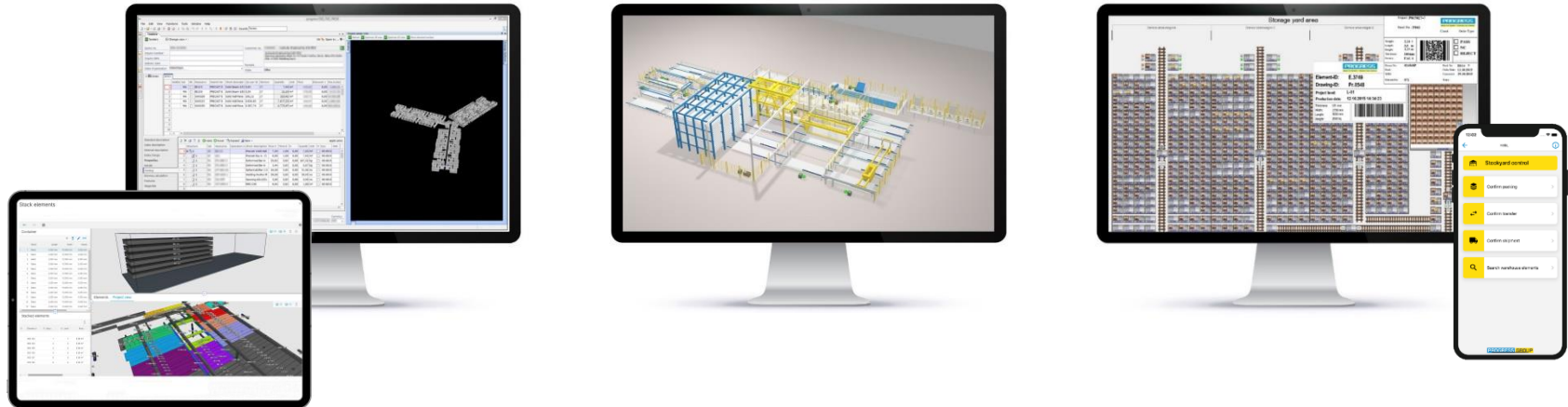


Source: PROGRESS GROUP - BIM Workflow

Today's Solutions

Getting from A to Z efficiently

- But how to use all those components in a **smooth, reliable** and therefore **efficient** workflow?



Source: PROGRESS GROUP

Today's Solutions

- In this session we will show:
 - How to benefit from cutting edge technology using **model-based** workflows...
 - How to take out the burden of **different software applications**...
 - How you can avoid using old fashioned **interfaces**...
 - How to counteract ever **growing complexity**...
 - Solutions that can be handled by **untrained personnel**...

Based on **more than 30 years of experience** in the **precast business** we show how you can benefit from readily available solutions.

Challenges of the Construction Sector



Building material prices, availability, and finding qualified labor to install the material are the primary influencing trends impacting the industry.

- **“All materials are experiencing cost increases** – concrete, steel, nails, etc. – but steel is one the biggest ones. 300% increase“ - **Engineer**



- **“Lead times have increased** for everything“ - **Building Owner / Operator**
- **“People are looking for material in 6 months,** but it’s such a challenge.” - **Contractor**

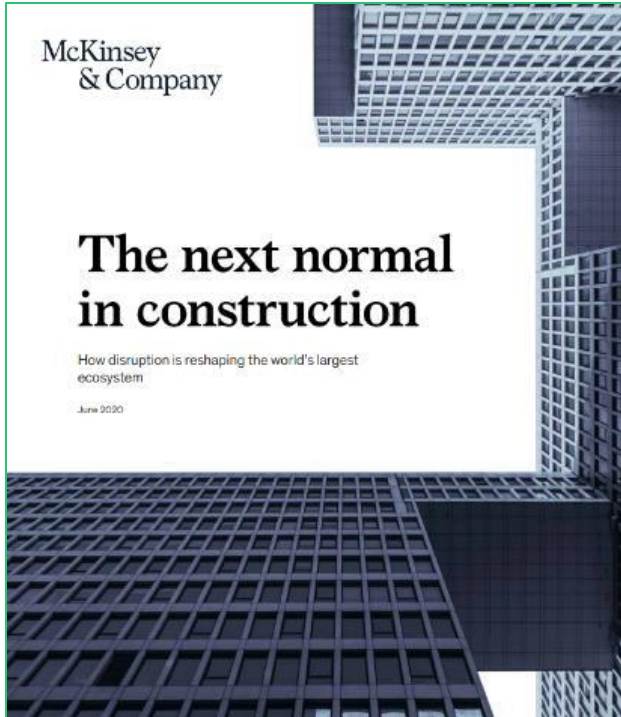


- **“It is becoming increasingly difficult to find qualified workers.** Our challenge isn’t finding work. It is finding people to do it.” - **Contractor**
- **“We are looking at every opportunity to address to labor.** We are open to any means or methods to do that.” - **Contractor**

Source: Precast Concrete
Institute Market Study 2022

New Ways of Thinking

Two important reports



Source: McKinsey & Company 2020

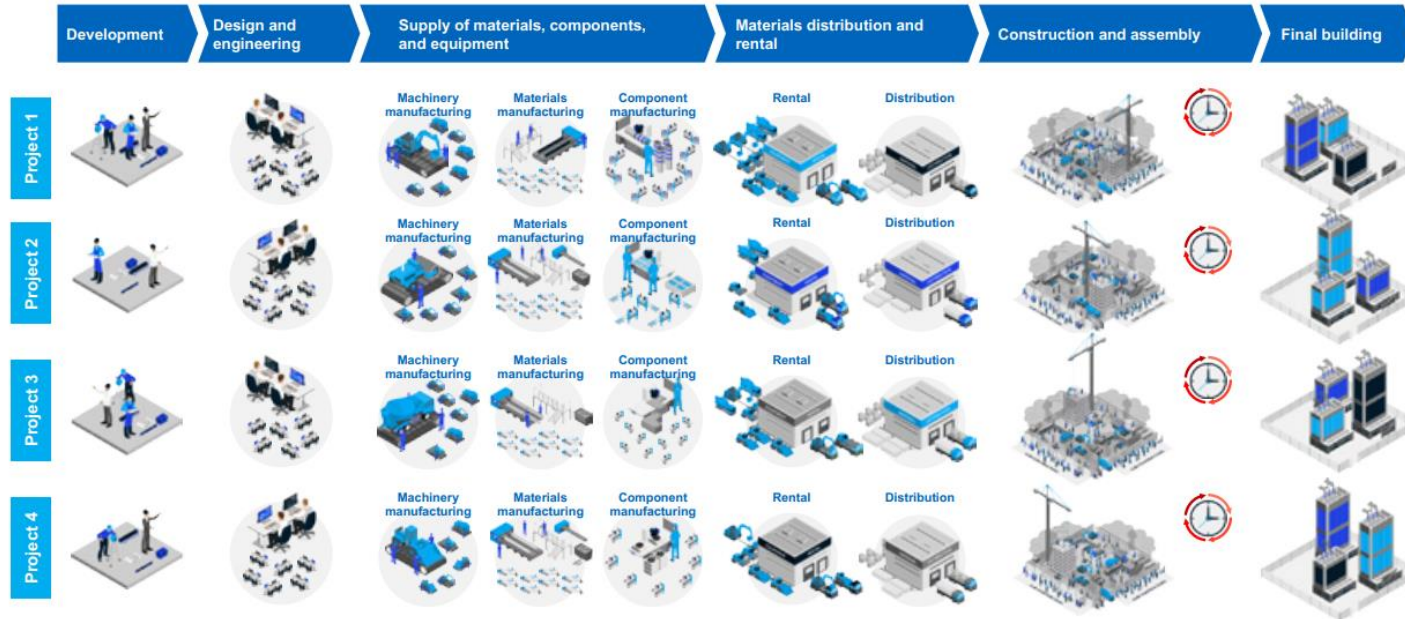


Source: Autodesk 2021

Industrialized Construction

McKinsey Report

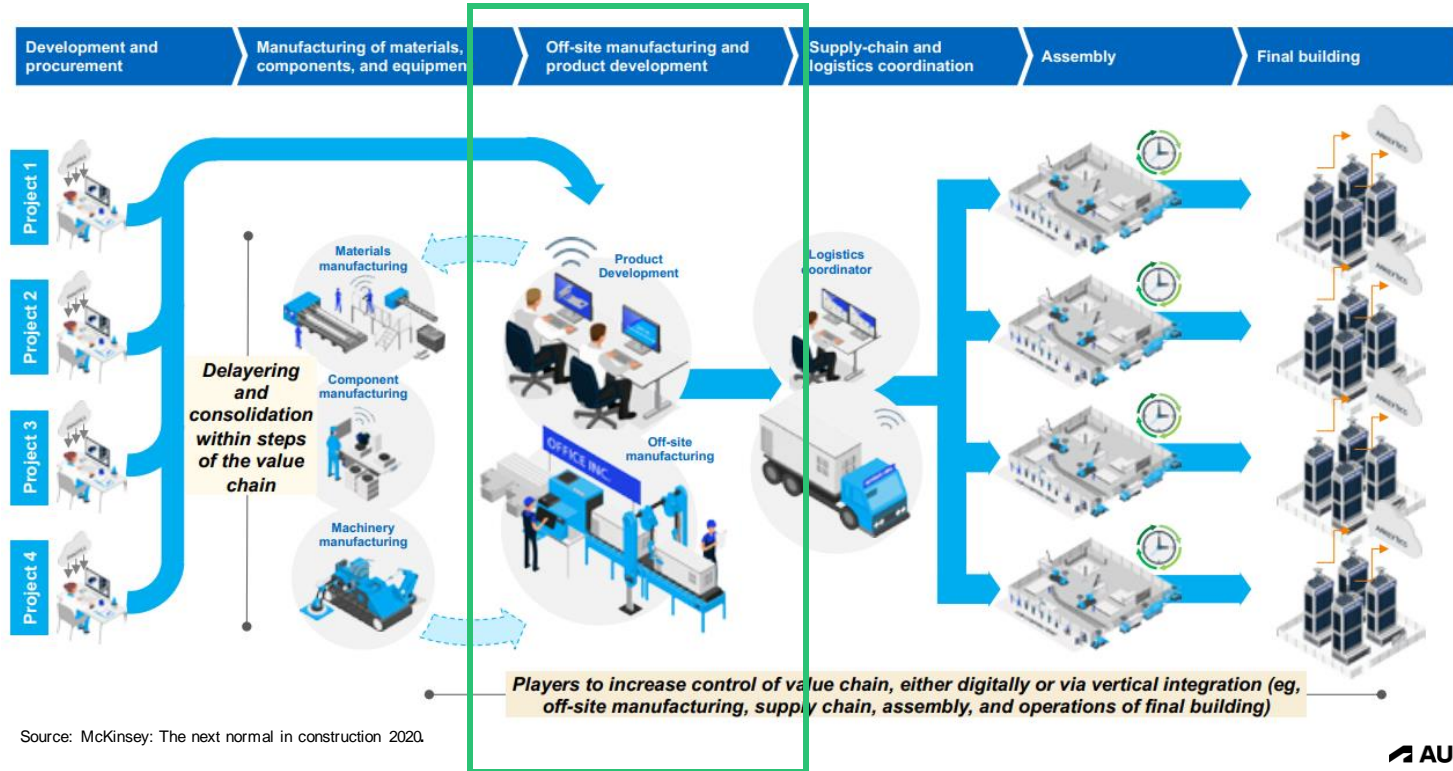
- Today's Construction:
 - A highly complex, fragmented, and skill and project-based construction process...



Source: McKinsey: The next normal in construction 2020

Industrialized Construction

- The construction ecosystem of the future:
 - A more **standardized, consolidated, and integrated** construction process: Industry 4.0



Source: McKinsey: The next normal in construction 2020.

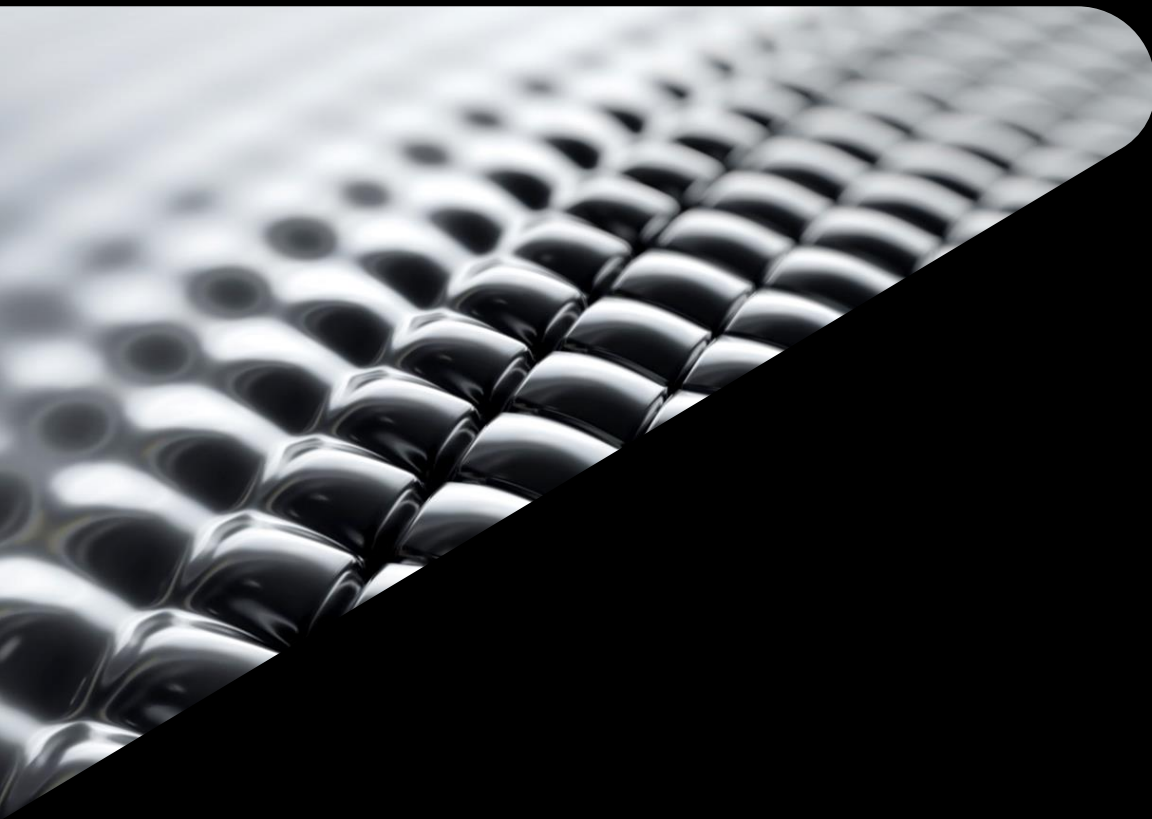
Industrialized Construction

Autodesk – Industrialized Construction Takeaway

- **“The construction industry is among the least digitized sectors around, with almost all its processes being repetitive and labor-intensive.”**
- **“Large projects typically extend 20 percent beyond the initial project completion date, and they are usually up to 80 percent over budget.”**

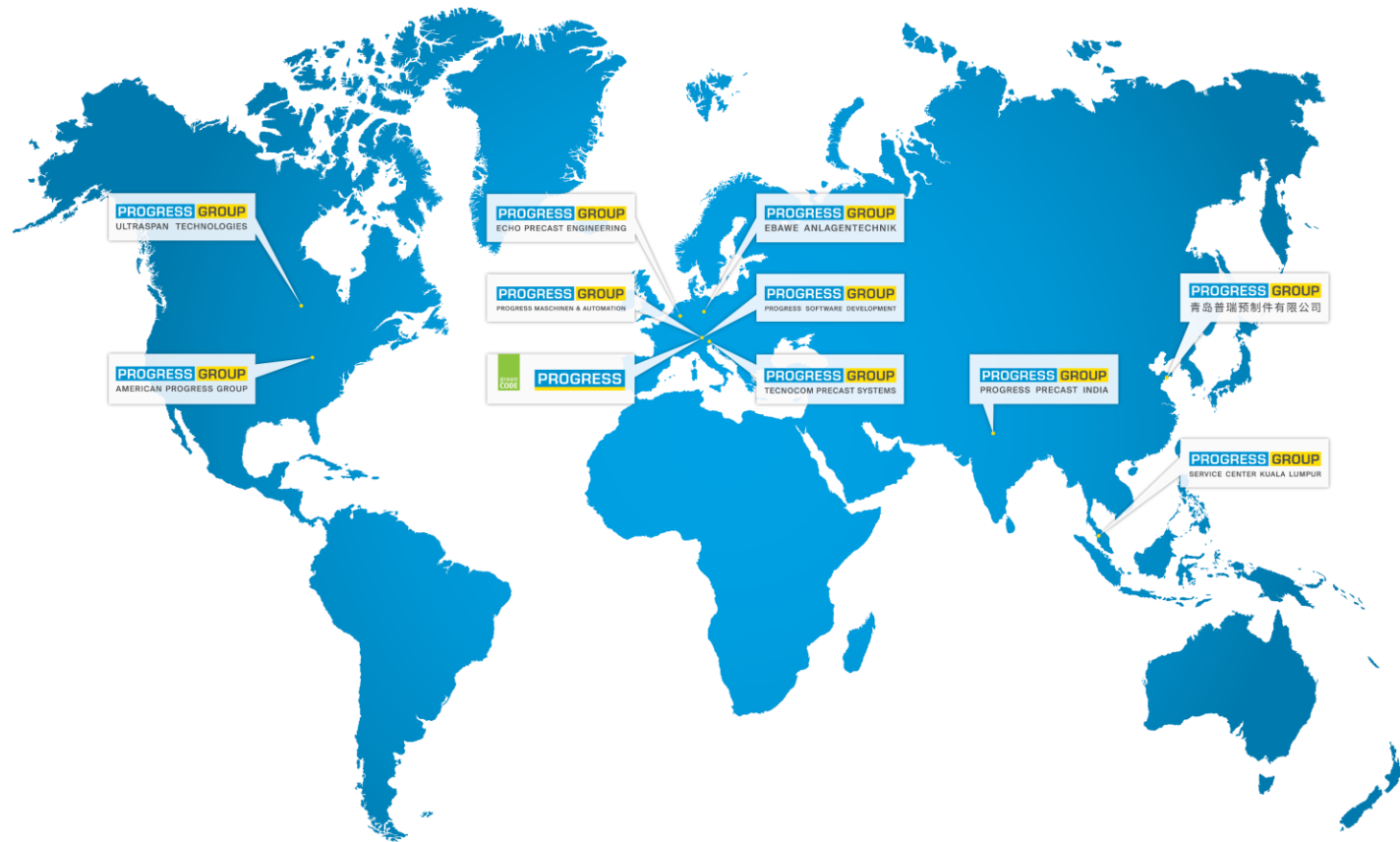


Source: Autodesk: Industrialized Construction



Who are we?

PROGRESS GROUP





270 Mio. €

Turnover 2021



700 employees
in the group



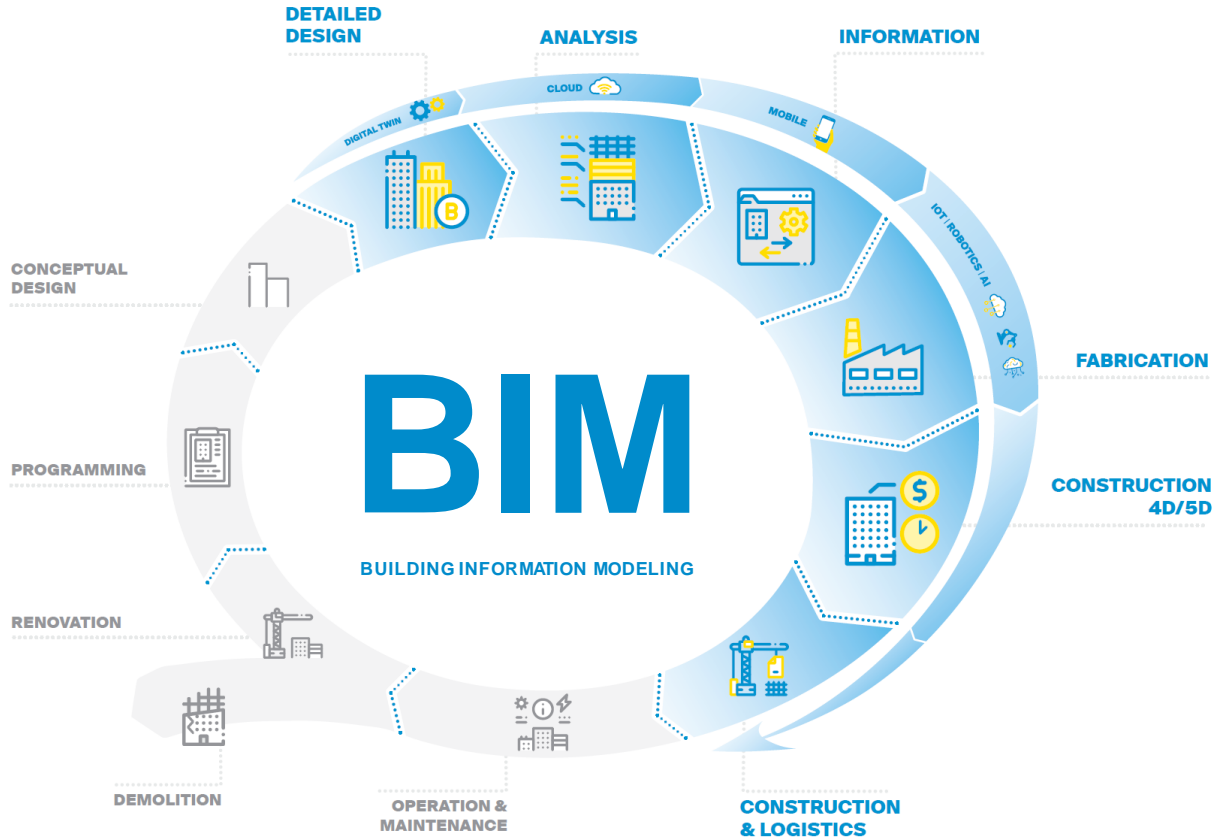
80 countries
with customer relations



1 partner
for precast concrete plants

————— COMPLETE —————
PRECAST TECHNOLOGY
————— WORLDWIDE —————

We are part of BIM

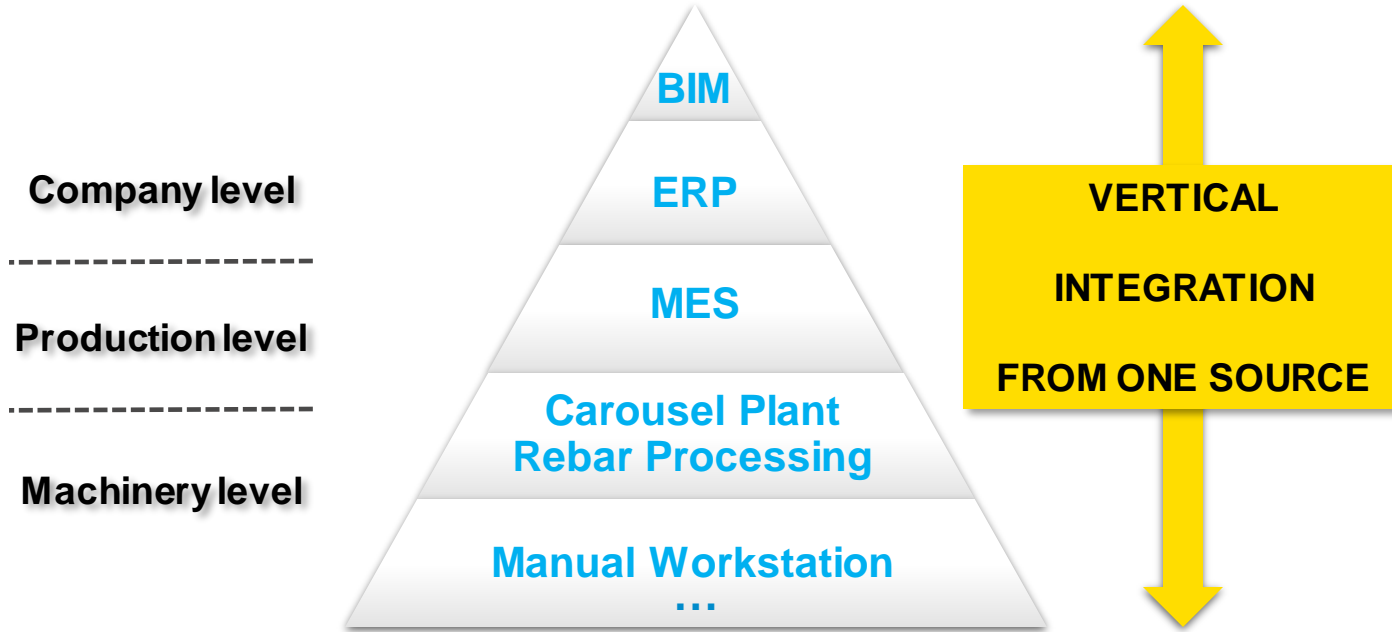


We are PROGRESS GROUP

PROGRESS **GROUP**

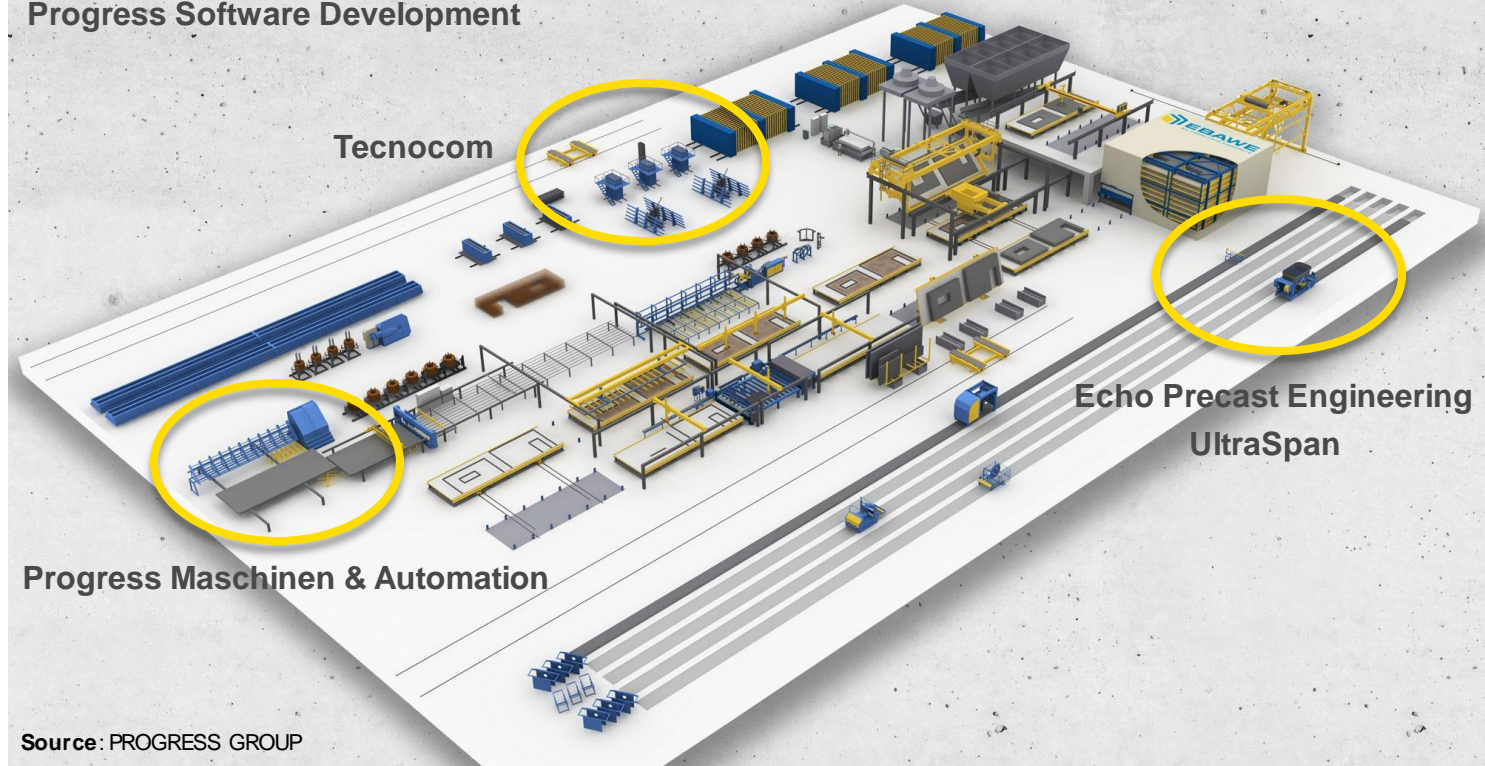


Industry 4.0

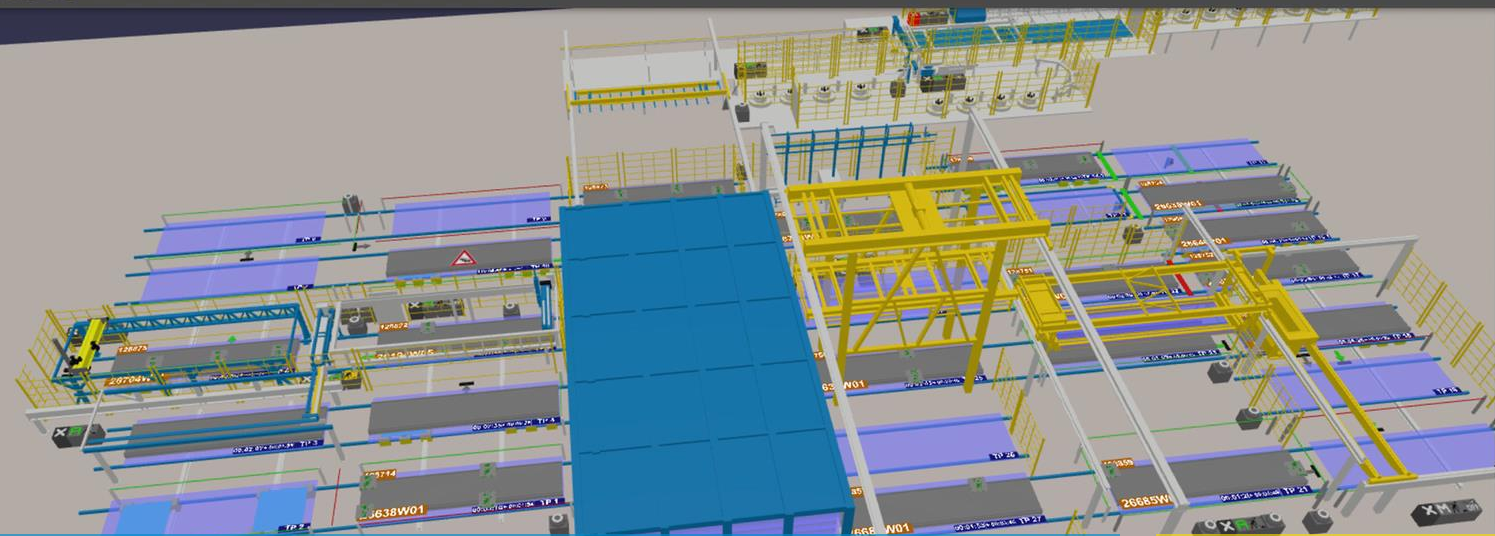


Mechanical engineering

EBAWE Anlagentechnik
Progress Software Development



Source: PROGRESS GROUP



SS	State
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2	{Position = OnTP StationId TP 2; Flags = 0}
3	{Position = OnTP StationId TP 6; Flags = 0}
4	{Position = OnTP StationId TP 11; Flags = 0}
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6	{Position = OnTP StationId TP 18; Flags = 0}
7	{Position = OnTP StationId TP 14.1; Flags = 0}
8	{Position = OnTP StationId TP 10; Flags = 0}

PRODUCTION

ANALYZATION

Playback Speed: - 19 +

2020-09-22 05:54:27



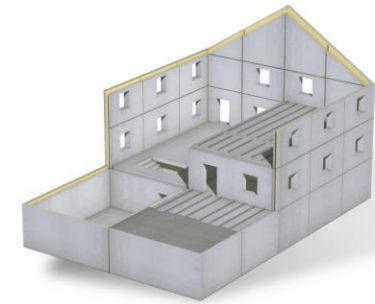
EBAWE Anlagentechnik

Turnkey carousel plants for the precast concrete industry

PROGRESS GROUP

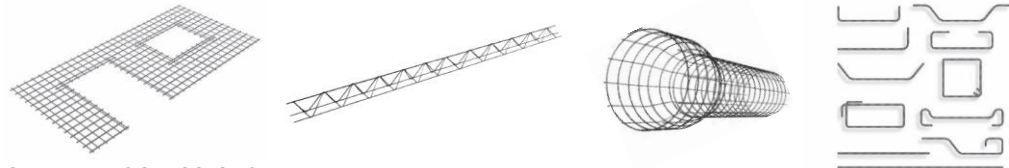


Source: PROGRESS GROUP



Progress Maschinen & Automation

Automated full-range solutions for the production of tailor-made reinforcement

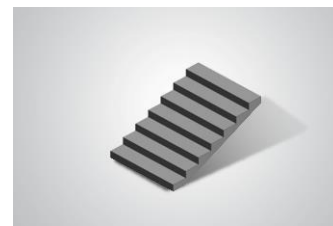
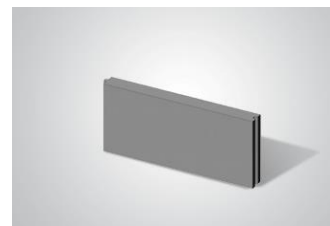
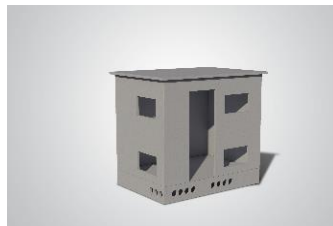


Source: PROGRESS GROUP



Tecnocom

Moulding systems and special solutions for the stationary production



Source: PROGRESS GROUP

Echo Precast Engineering

Machinery and plants for prestressed concrete products



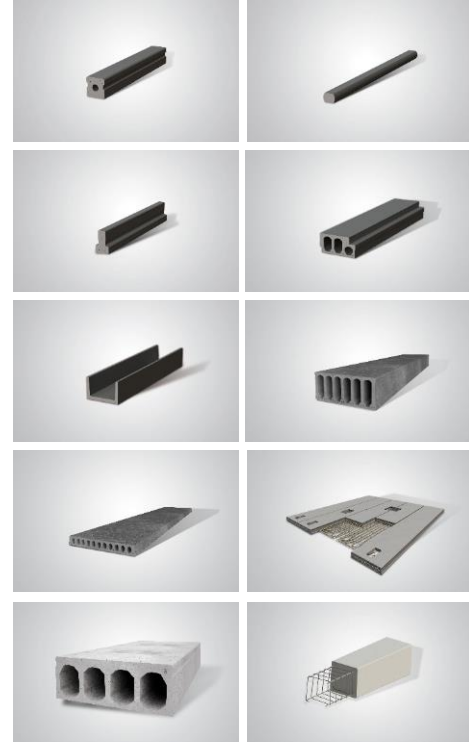
UltraSpan

Machinery and plants for prestressed concrete products

PROGRESS GROUP



Source: PROGRESS GROUP



Progress Software Development

Full-range supplier for overall software solutions for the precast and rebar industry



Source: PROGRESS GROUP



Learning Objective 1

Learn how to enable “**Freedom in Design**” and “**Automation in Fabrication**”.



Connecting worlds

PROGRESS GROUP

R AUTODESK® REVIT®
DESIGN • CONNECT • OPTIMIZE



World of Design

#BIM
#IFC



HQ PROGRESS GROUP in Brixen



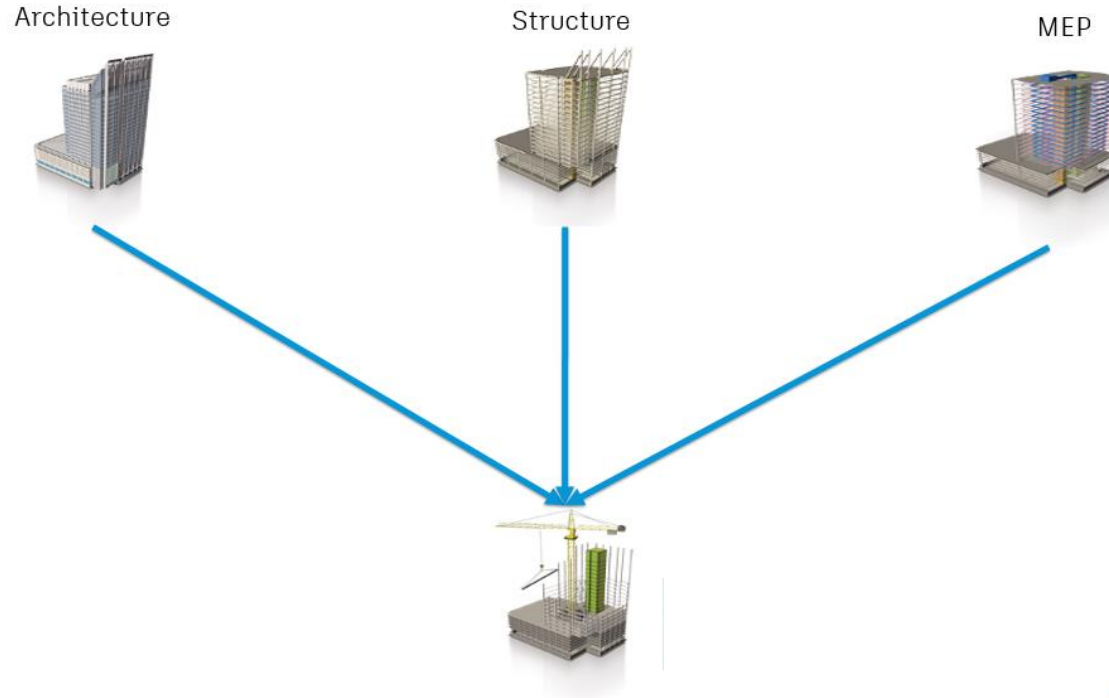
PROGRESS GROUP

**World of Industrialized
Fabrication**

#PXML
#IFC4precast

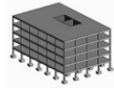
Different parties

- Enable freedom in „how to“ bring in data
- Avoid mistakes when using different software solutions and interfaces

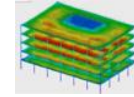


Streamlined Workflow within A-E-F

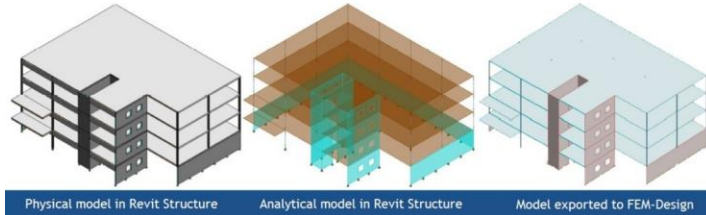
Architects
Design



Engineers
Structural



Fabrication &
Delivery



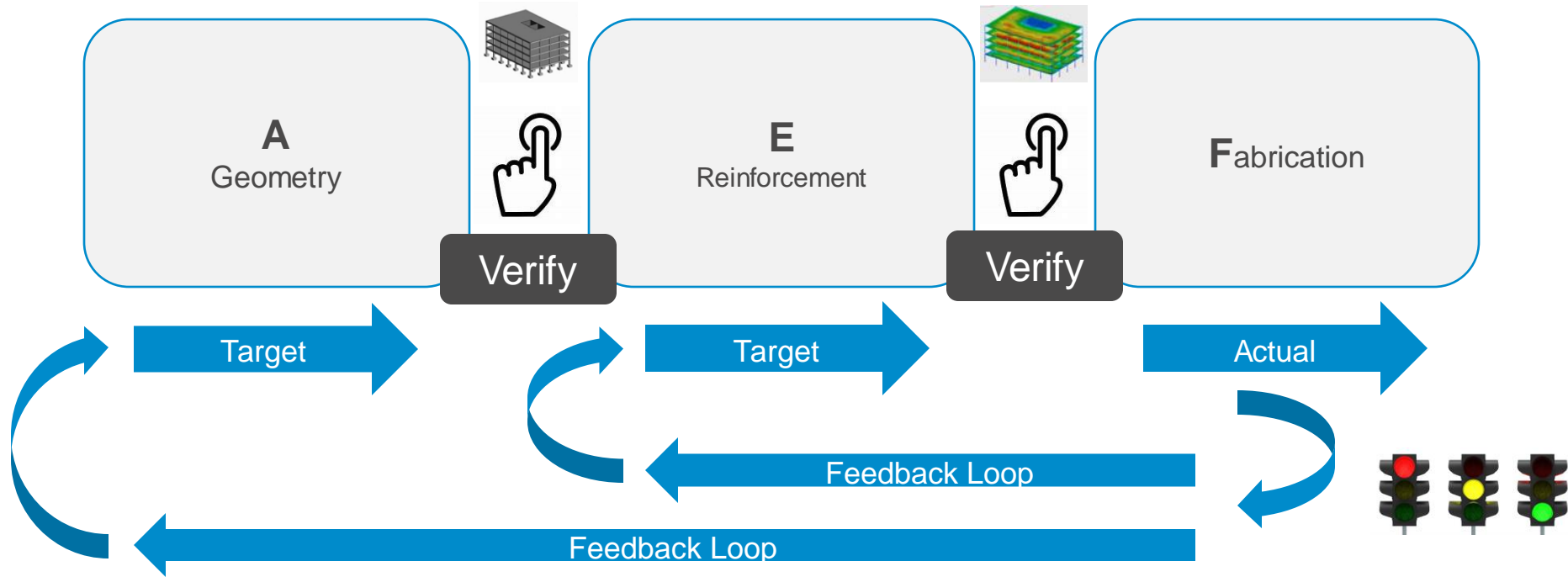
dear STUDIO



Streamlined MODEL-BASED Workflow

Keeping as much information up-to-date as possible

Ownership & Feedback Loop within A-E-F



Verify Results at any stage of the design process to **make sure Design is safe and sound**

Learning Objective 2

Learn how to improve workflows by using a **model-based approach** and creating digital twins.



Source: PROGRESS GROUP

Model to Fabrication

R AUTODESK® REVIT®
DESIGN • CONNECT • OPTIMIZE



World of Design

#BIM

#IFC



Model2Fabrication



PROGRESS GROUP

**World of Industrialized
Fabrication**

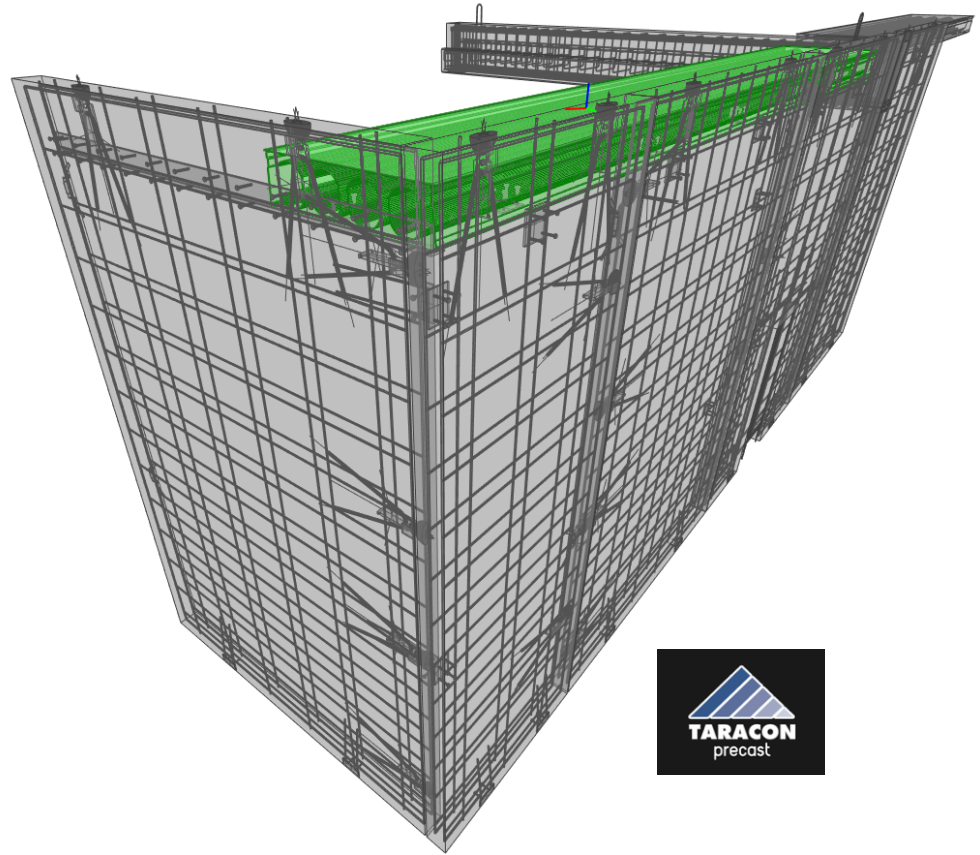
#PXML

#IFC4precast

Model2Fabrication

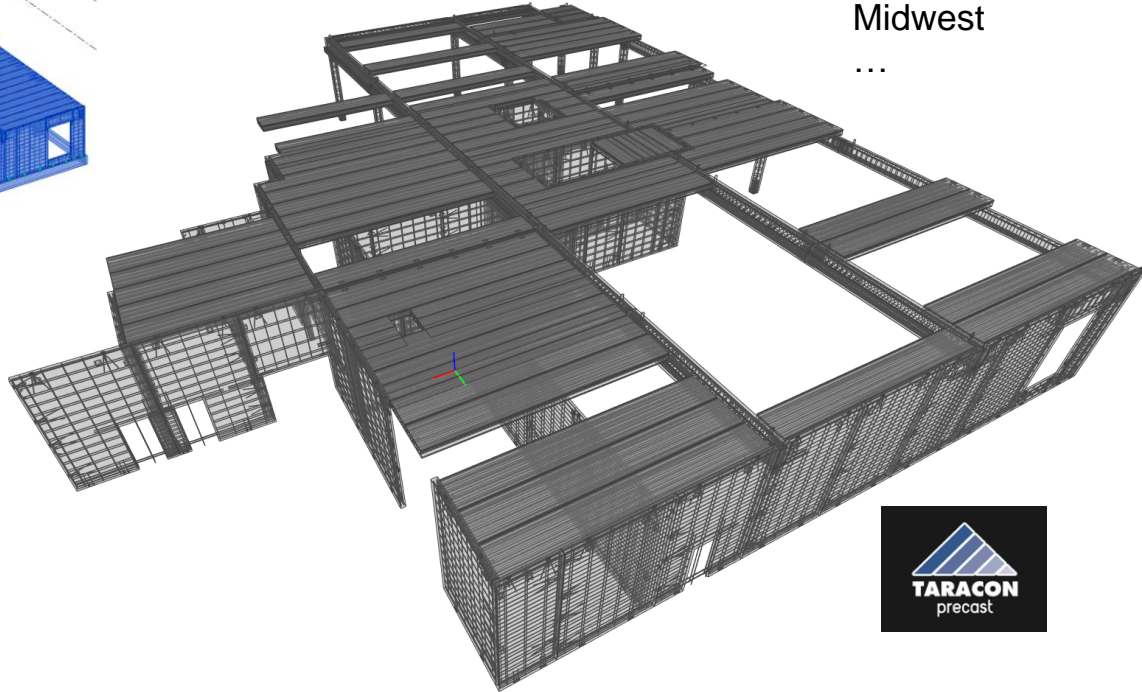
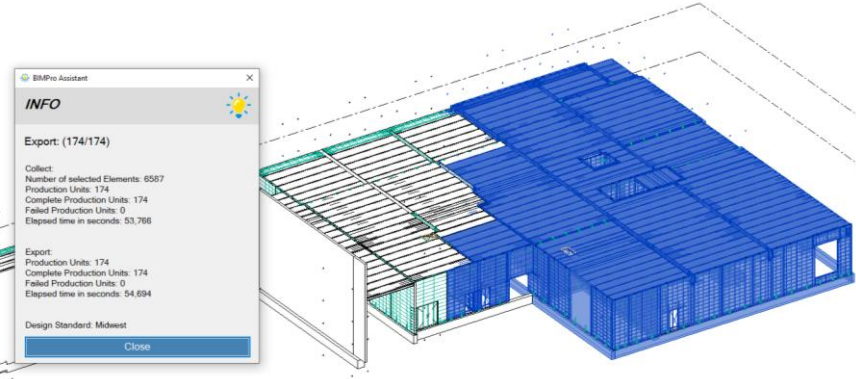
PROGRESS GROUP

- What you See is What you Get
- Extract even more
- Fill in the blanks
- Use every detail available
- Easy to use



What you See is What you Get

You decide:
EDGE[®]R
CEG
Midwest
...



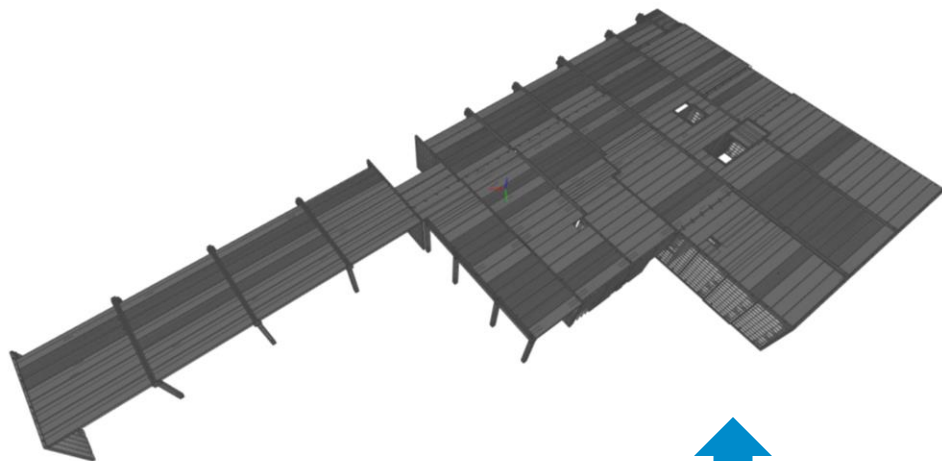
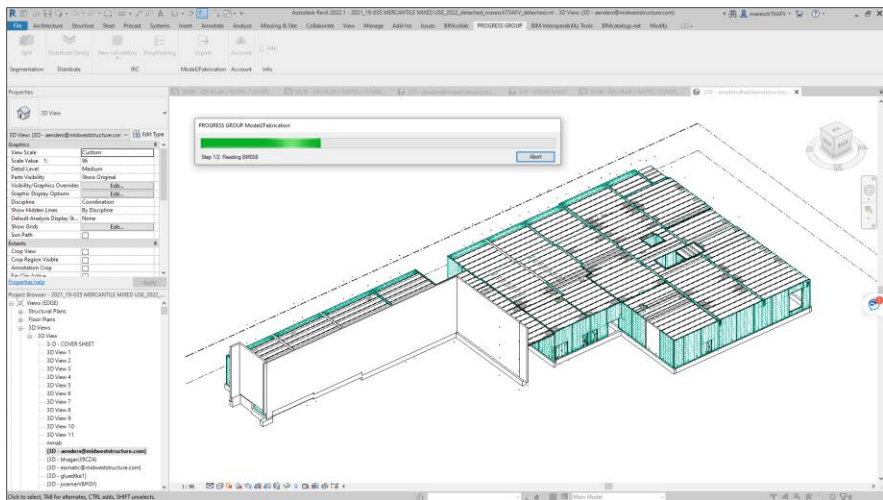
ProgressXML

Version 1.3 / Revision 2021-07-15

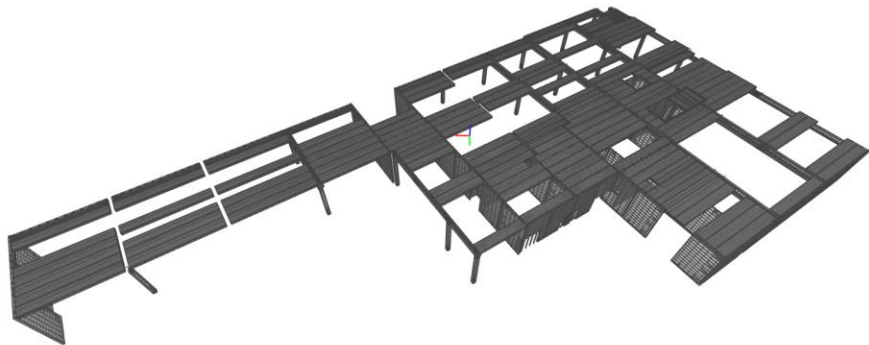
An innovative data transmission concept for precasters and reinforcers



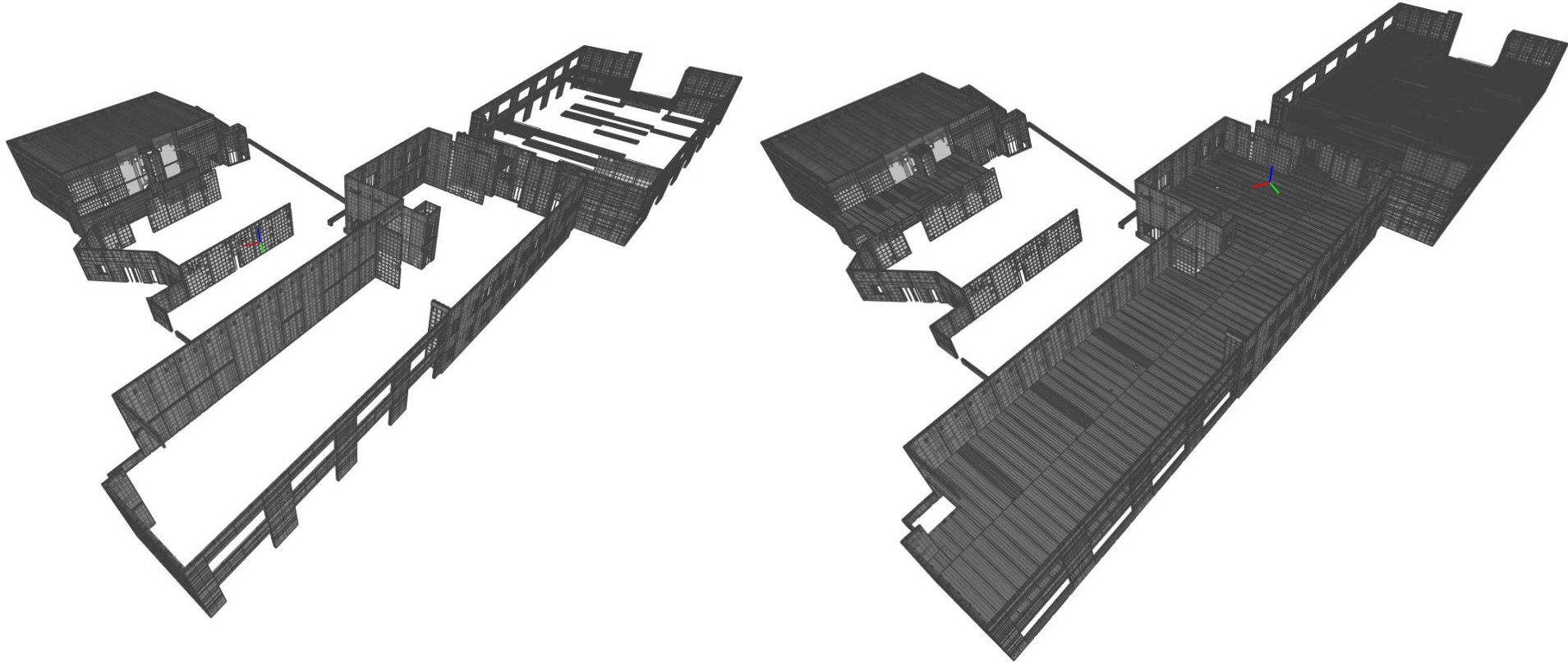
Extract even more



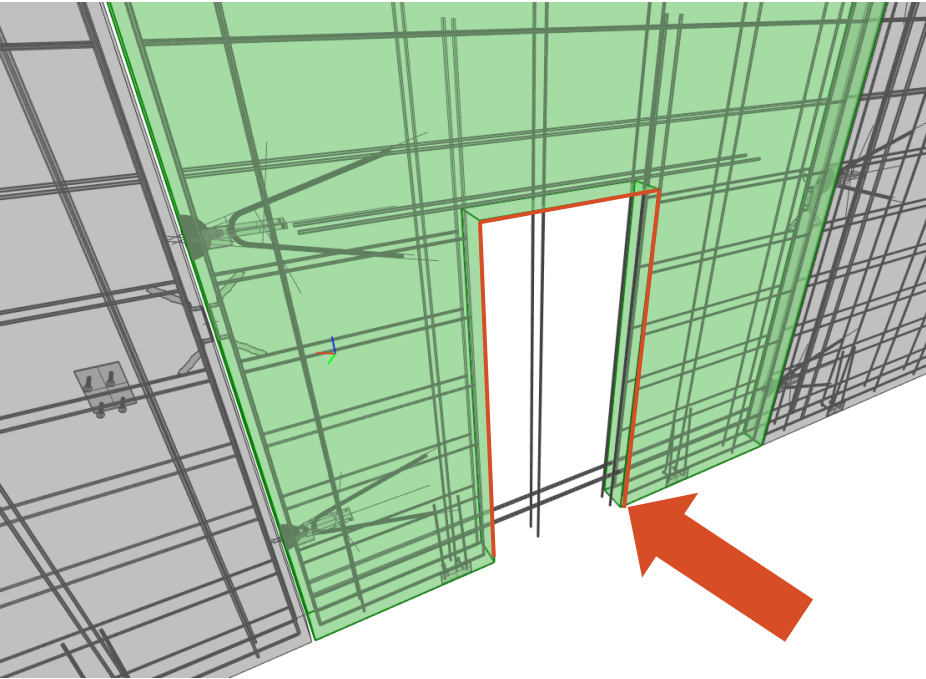
← Detailed Elements vs. Detailed & Hulls



Fill in the Blanks



Use every detail available



Source:

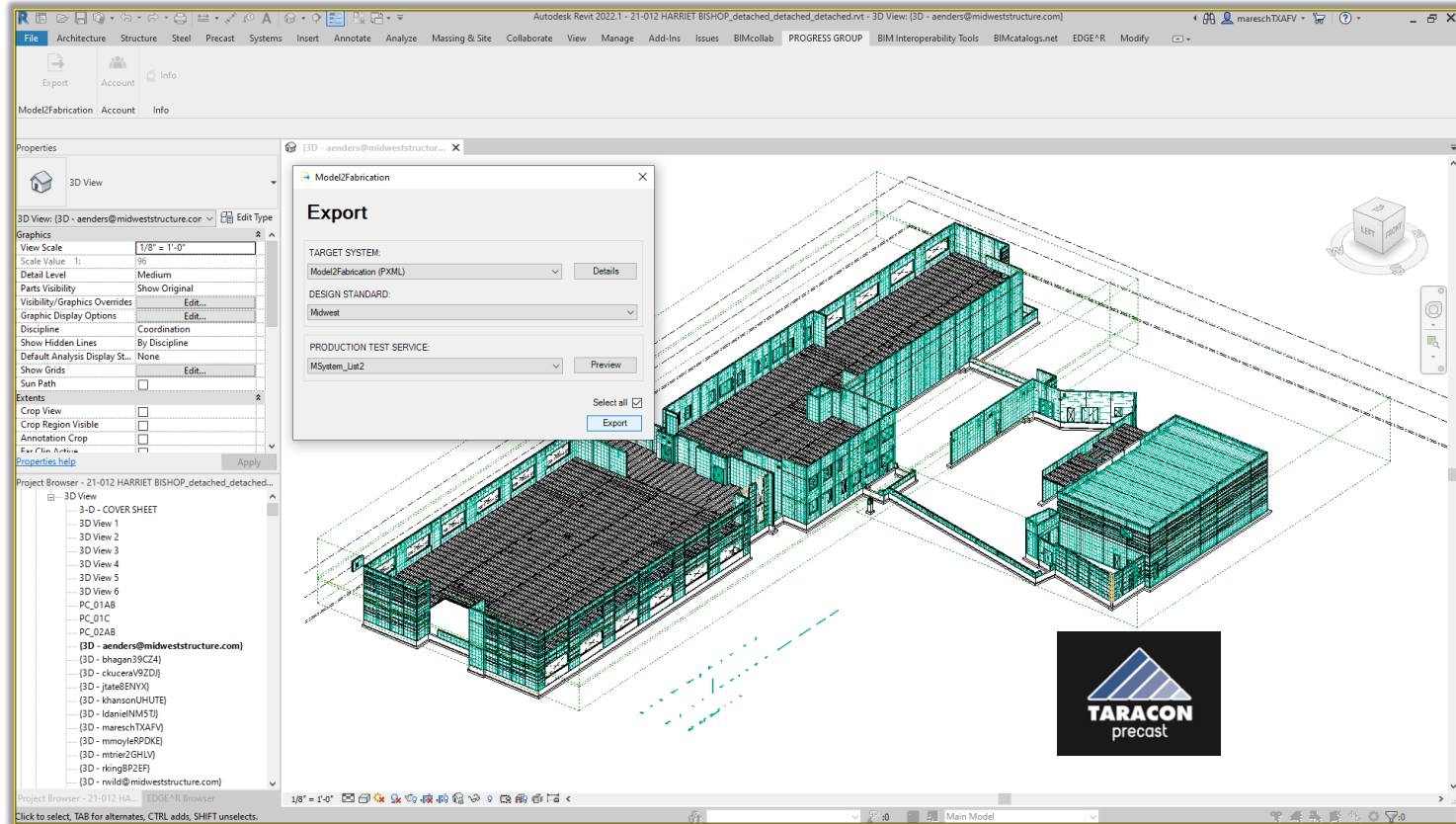
Geometry converts to
 Geometry converts to
 Attribute converts to
 Attribute converts to
 Attribute converts to
 Attribute converts to

Result:

Geometry
 Article
 Attribute
 Article
 multiple Articles
 multiple Articles
 based on Geo

Any given information within the **Revit Model** will be used to create the most comprehensive output imaginable.

Export via Model2Fabrication



Properties

3D View

3D View: (3D - aenders@midweststructure.com) Edit Type

Graphics

View Scale	1/8" = 1'-0"
Scale Value 1:	96
Detail Level	Medium
Parts Visibility	Show Original
Visibility/Graphics Overrides	Edit...
Graphic Display Options	Edit...
Discipline	Coordination
Show Hidden Lines	By Discipline
Default Analysis Display St...	None
Show Grids	Edit...
Sun Path	<input type="checkbox"/>

Extents

Crop View	<input type="checkbox"/>
Crop Region Visible	<input type="checkbox"/>
Annotation Crop	<input type="checkbox"/>

For Film Archive

Properties help

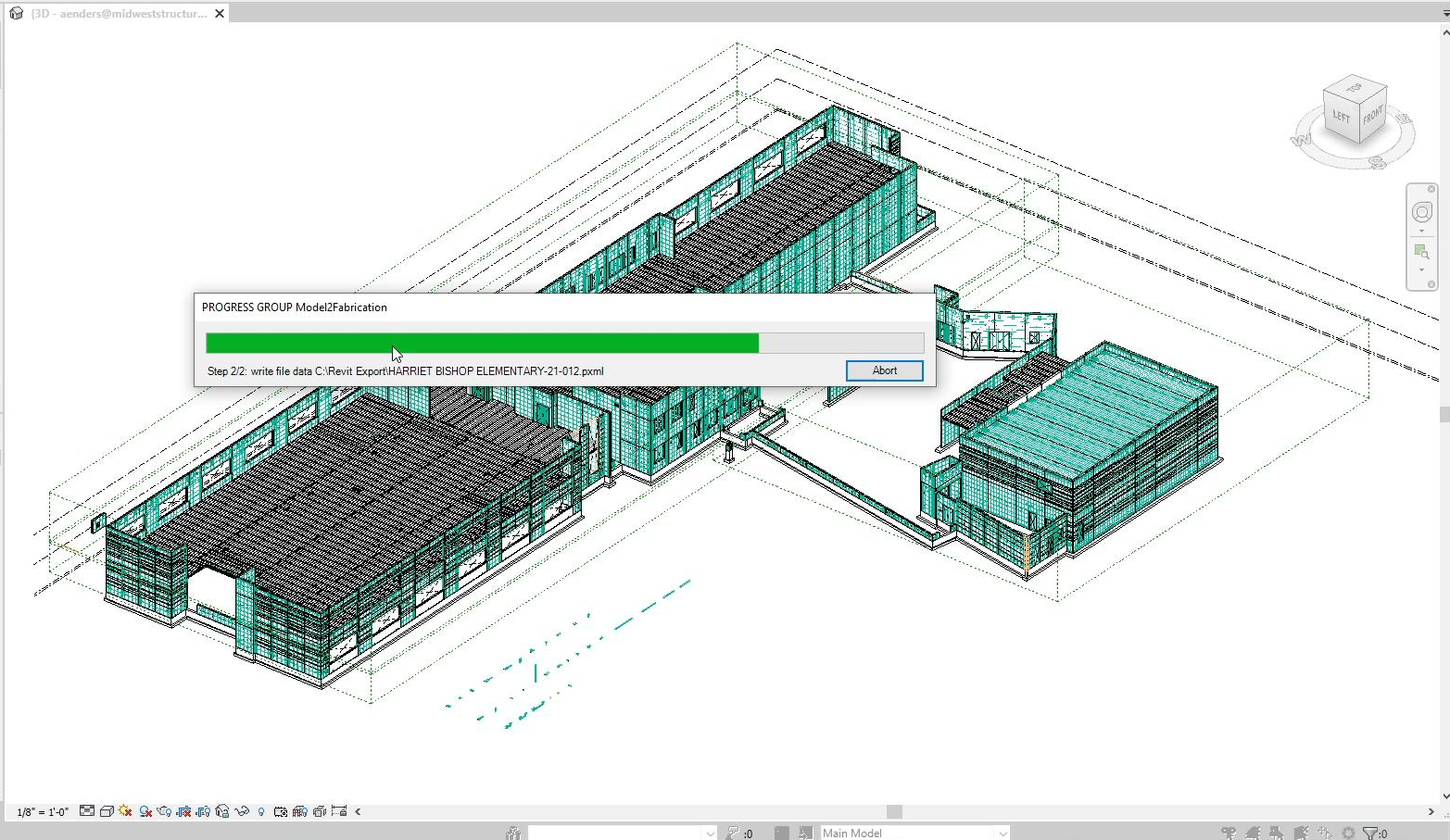
Apply

Project Browser - 21-012 HARRIET BISHOP_detached_detached...

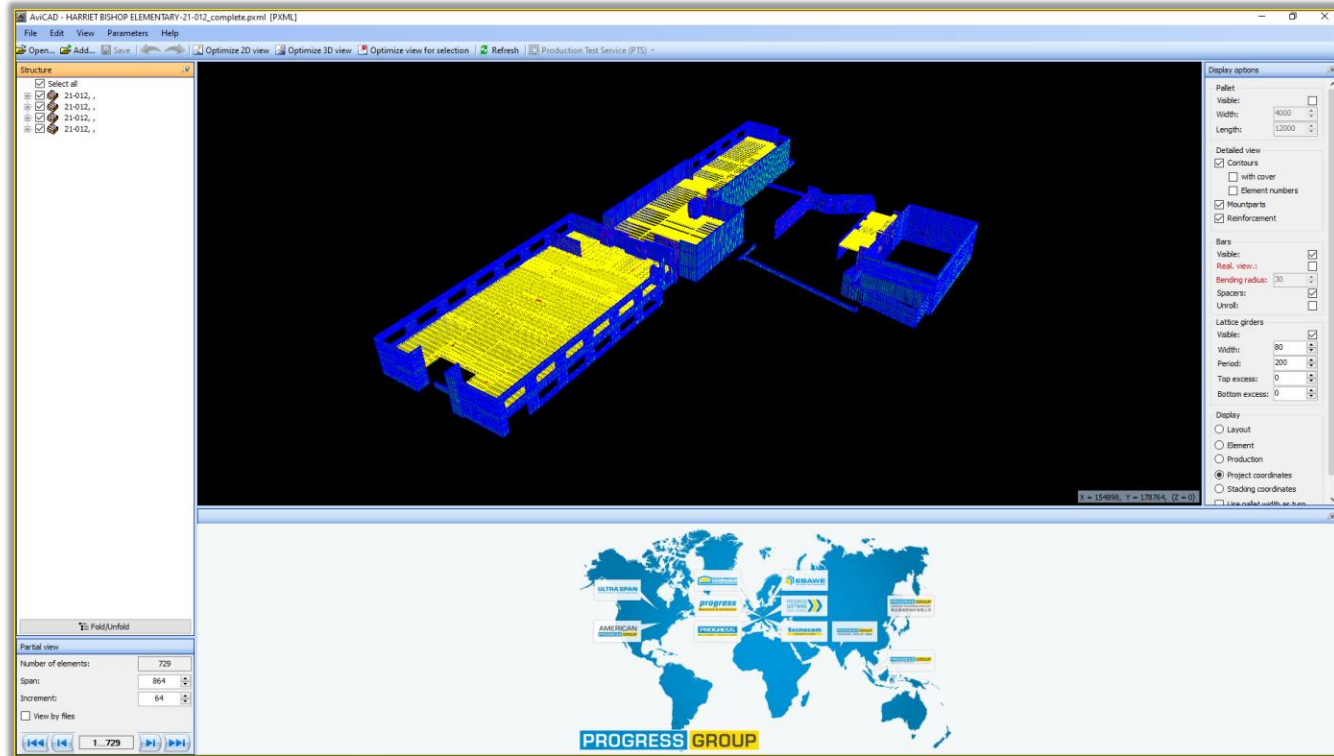
- 3D View
 - 3-D - COVER SHEET
 - 3D View 1
 - 3D View 2
 - 3D View 3
 - 3D View 4
 - 3D View 5
 - 3D View 6
 - PC_01AB
 - PC_01C
 - PC_02AB
 - (3D - aenders@midweststructure.com)
 - (3D - bhagan39CZ4)
 - (3D - ckuceraV9ZDJ)
 - (3D - jtate8ENVX)
 - (3D - khansonUHUTE)
 - (3D - ldanielNM5TJ)
 - (3D - mareschTXAFV)
 - (3D - mmoylerPDK)
 - (3D - mtrier2GHLV)
 - (3D - rkingBP2EF)
 - (3D - rwild@midweststructure.com)

Project Browser - 21-012 HA... EDGE^R Browser

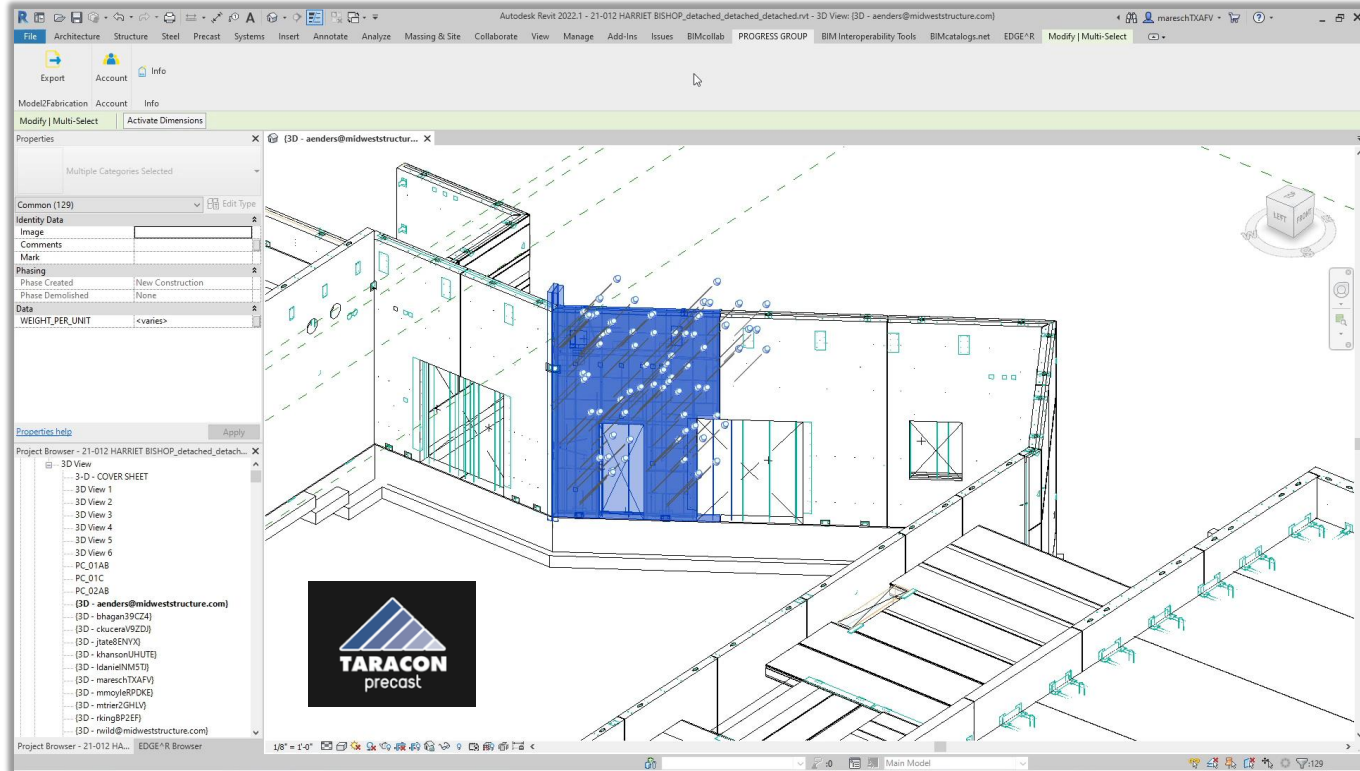
Click to select, TAB for alternates, CTRL adds, SHIFT unselects.



Resulting PXML file, ready for production



Check model data for production via PTS-Server




```

1  {
2      {
3          "ruleName": "MaxLengthError",
4          "ruleType": "NumericalRule",
5          "ruleObject": "DoubleWall",
6          "ruleProperty": "Double",
7          "ruleOperator": "Greater",
8          "ruleComparisonValue": "1",
9          "ruleErrorMessage": "ist länger als 1m."
10     },
11 },
12 {
13     {
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15         "ruleType": "NumericalRule",
16         "ruleObject": "SolidWall",
17         "ruleProperty": "Area",
18         "ruleOperator": "Less",
19         "ruleComparisonValue": "1",
20         "ruleErrorMessage": "ist breiter als 1m."
21     },
22 },
23 {
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26         "ruleType": "NumericalRule",
27         "ruleObject": "DoubleWall",
28         "ruleProperty": "Area",
29         "ruleOperator": "Less",
30         "ruleComparisonValue": "1",
31         "ruleErrorMessage": "ist höher als 1m."
32     },
33 },
34 {
35     {
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37         "ruleType": "PropertyRule",
38         "ruleObject": "DoubleWall",
39         "ruleProperty": "Name",
40         "ruleComparisonValue": "WWW",
41         "ruleErrorMessage": "enthält kein WW in Name"
42     },
43 },
44 {
45     {
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47         "ruleType": "PropertyRule",
48         "ruleObject": "",
49         "ruleProperty": "ElementId",
50         "ruleOperator": "NotEqual",
51         "ruleComparisonValue": "ElementId",
52         "ruleErrorMessage": "enthält kein WW in ElementNumber"
53     },
54 },
55 {
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61         "ruleOperator": "NotEqual",
62         "ruleComparisonValue": "ElementId",
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64     },
65 },
66 {
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71         "ruleProperty": "Height",
72         "ruleOperator": "Greater",
73         "ruleComparisonValue": "1",
74         "ruleErrorMessage": "ist schwerer als 1kg."
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Get BCF Feedback

Alle Issues

MacLengthError	1. MacLengthError	2. MacLengthError
3. MacLengthError	4. MacLengthError	5. ContainerError
6. ContainerError	7. ElementNumber	8. ElementNumber
9. Test	10. Test	11. Test

MacLengthError
14 ist länger als 1m.
Nicht zugewiesen
Attrib.: Issue, Normal
Unresolved

E: Kommentar

11. 14 ist länger als 1m

Erstellt von: Schraab

Bimpro

BIMcollab



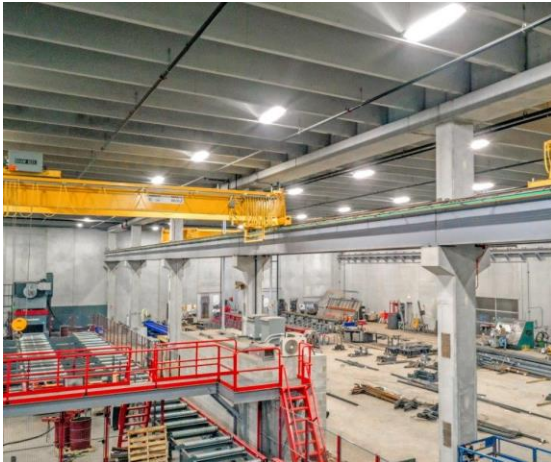
Learning Objective 3

Learn how first movers benefited from
Model2Fabrication and our solutions.

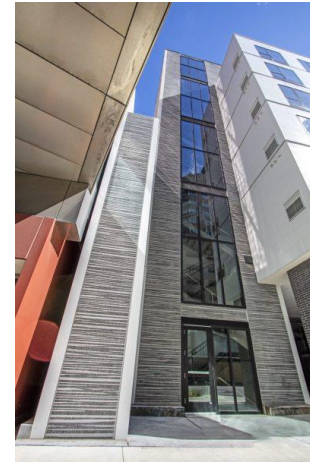


Special thanks to our partners:

- Taracon Precast, Hawley, MN
- PTAC Engineering, LLC.
- Partner and model provided for collaboration with PROGRESS GROUP software teams

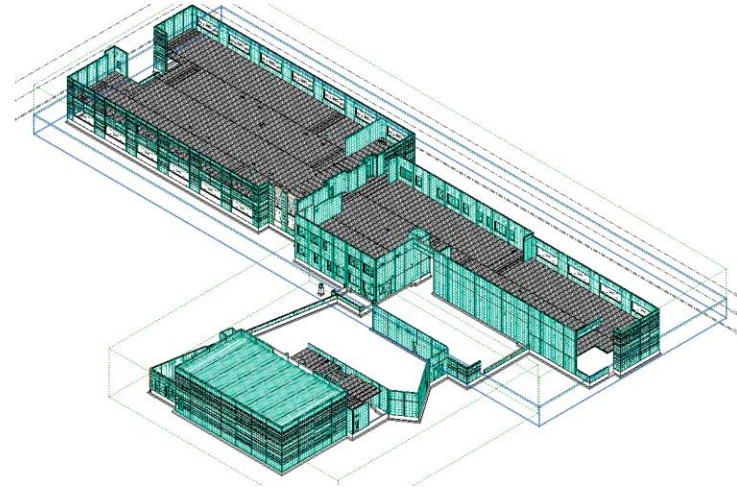


Source: Taracon Precast 2022



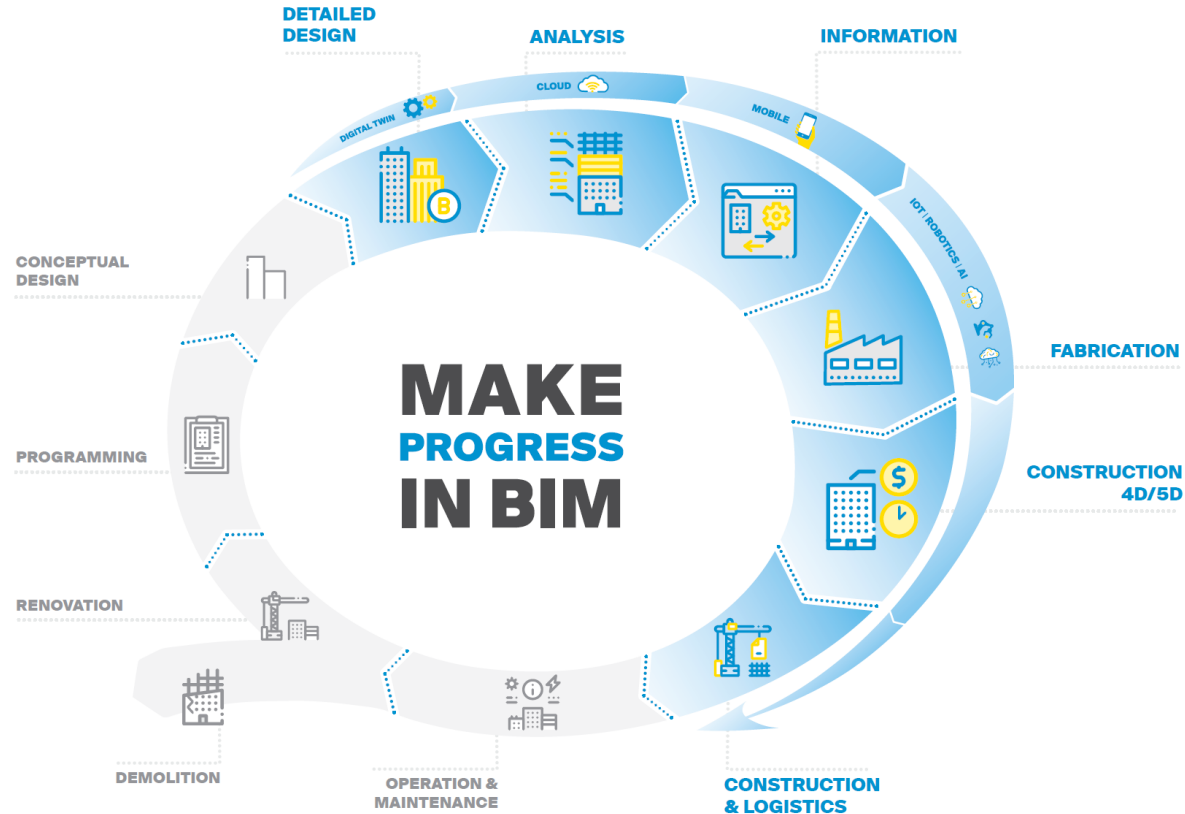
Project scope

- Taracon wants to digitalize their production and delivery process
- Cut costs by 30% when using 3D-models in fabrication
- BIM models to steer the digital process
- Move away from paperwork towards digital factory
- Digital Twin for erection building



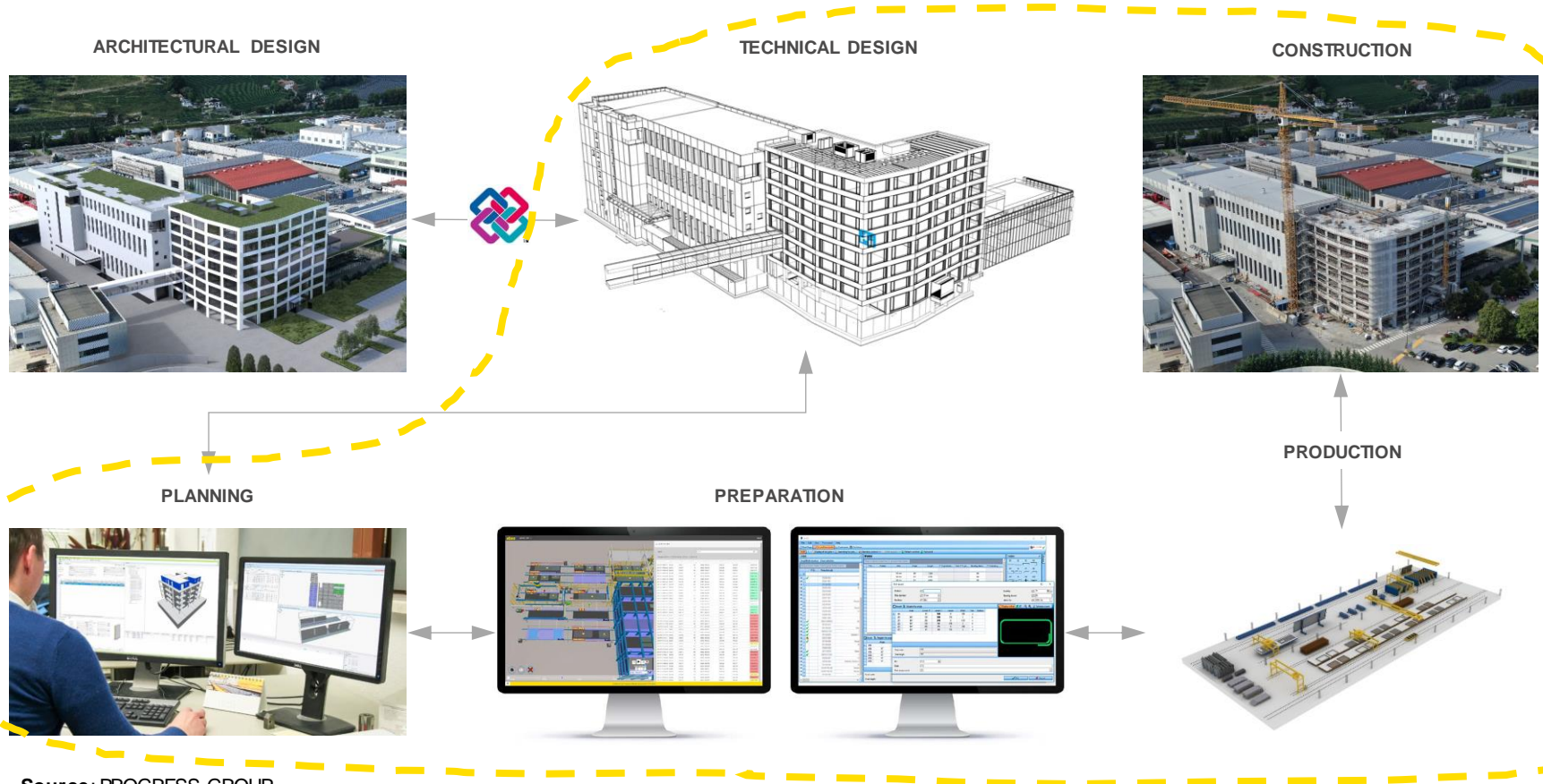
Source : Taracon Precast 2022

BIM workflow as underlying process



Source: PROGRESS GROUP

Streamline processes



Source: PROGRESS GROUP

Project example

APG offer in case of Taracon

Demand

- Create **fully detailed 3D model** out of existing Revit models
- Long bed
- Workflow
- Quality check
- Data for checking



APG solutions in use

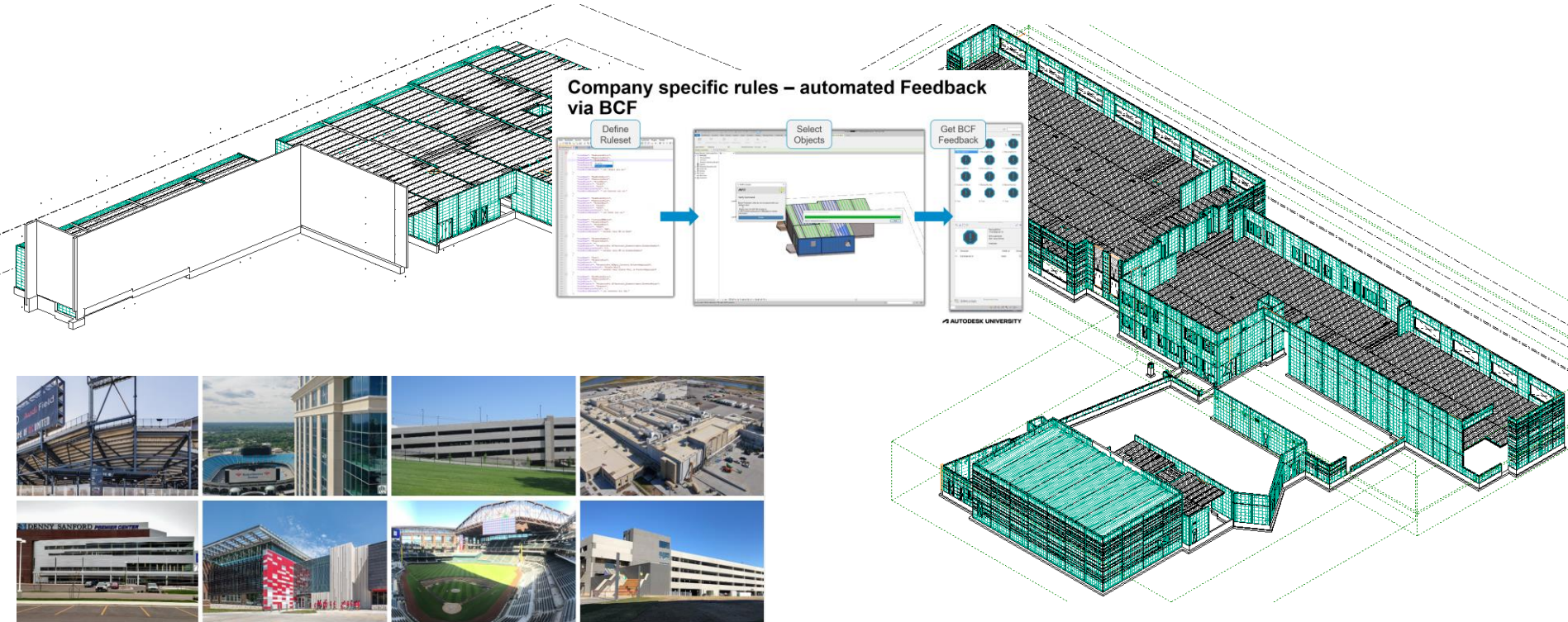
Model2Fabrication



***ahead*APS**

Model & Drawings

M2F is the model for further use in the workflow



Benefits of model-based workflows

Why Taracon is favouring model-based

Demand

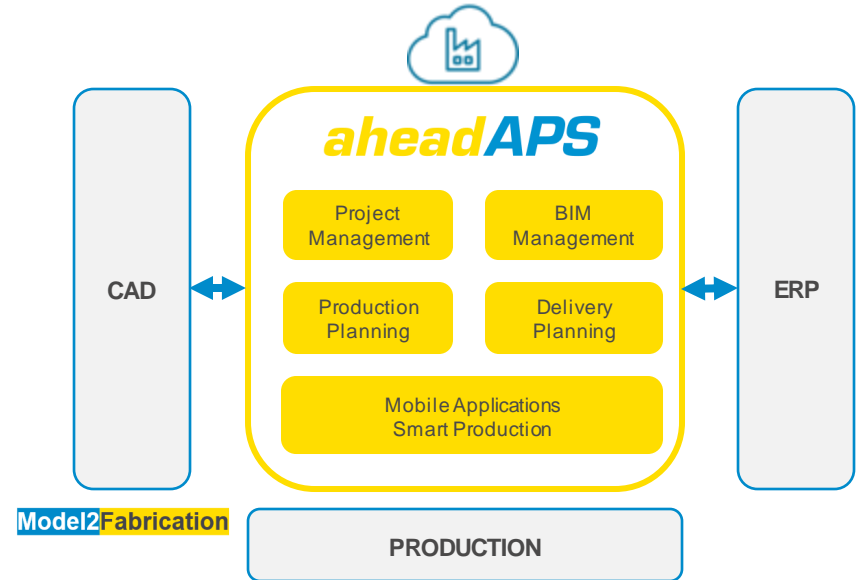
- Creating Design model
- Creating PDF for fabrication
- Use of model in fabrication
- Use of PDF in fabrication

Benefit time / cost / quality wise

- Takes about **50%** of time
- Takes about **50%** of time taking into account „creating“, „checking“, ...
- **30% in cost savings** with the right tools 3D model comes for free
- Complicated and lots of errors no workflow driven feedback loop with reference to object / element

*ahead***APS**- Making data work

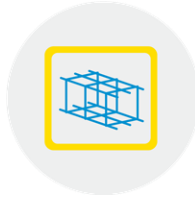
- APS – **A**dvanced **P**lanning and **S**cheduling System
- Using **BIM Data** to streamline processes
- Cloud-based solution that acts as a HUB platform between the CAD, ERP and MES systems to cover the specific business processes of the precast concrete industry
- Enables manufactures to deliver on time and produce more efficiently
 - **Reduce unit costs** with more efficient production runs
 - **Improve decisions** with capacity visibility & scenarios and Analytics
- Plugs in easily to the existing system and doesn't require a lot of maintenance



Why *ahead*APS ?



BIM & BCF
Integration



3D Stacking,
Prod. Planning &
Project Management



SaaS
Plug & Play
Platform



HUB system
Open Interfaces



**Scalable
Solution**
Modular usage &
Pricing

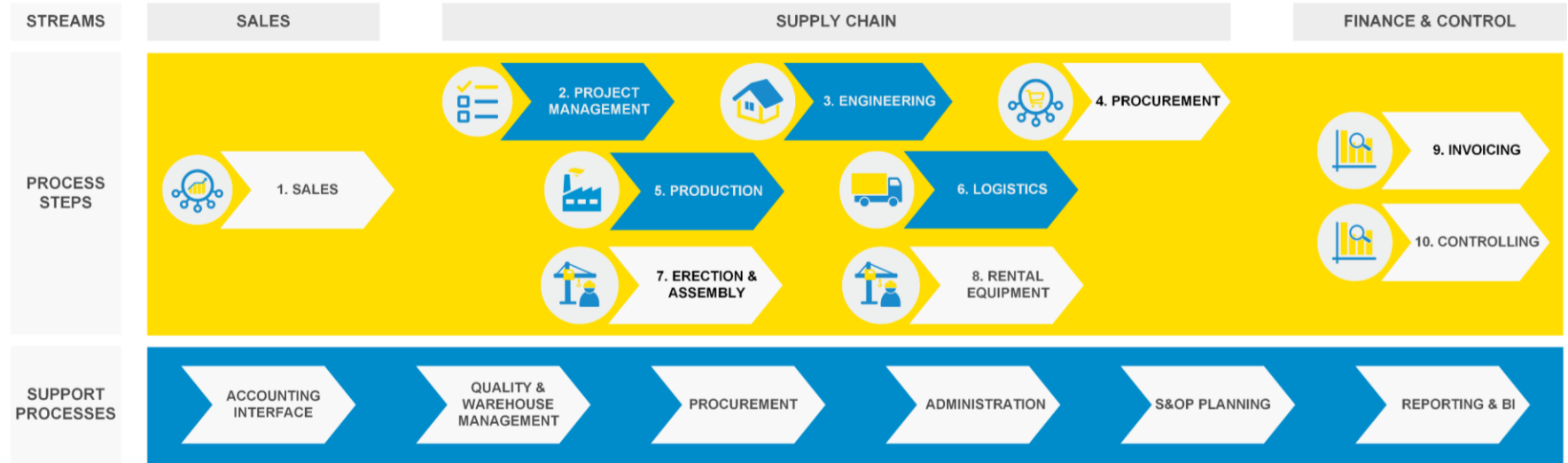


Access from
any device
anywhere
anytime

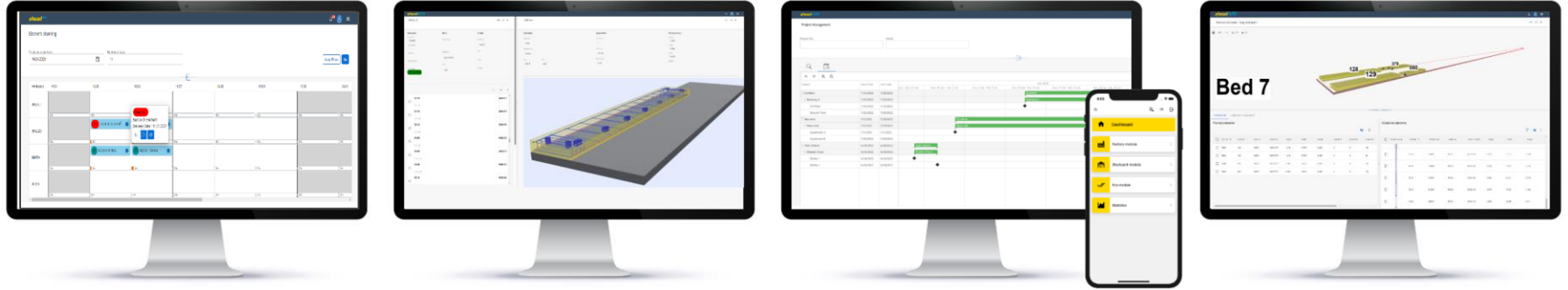


**Modern
Solution**
State-of-the-art
Technology

Business processes overview



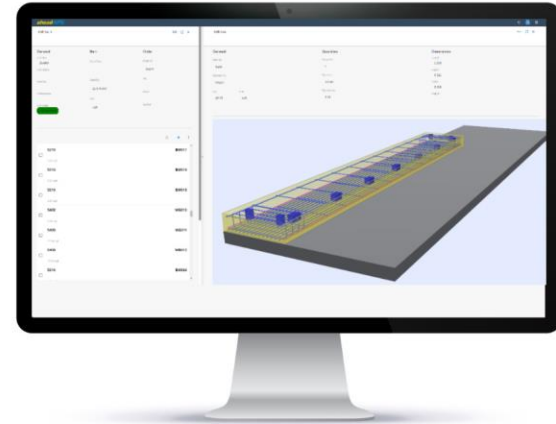
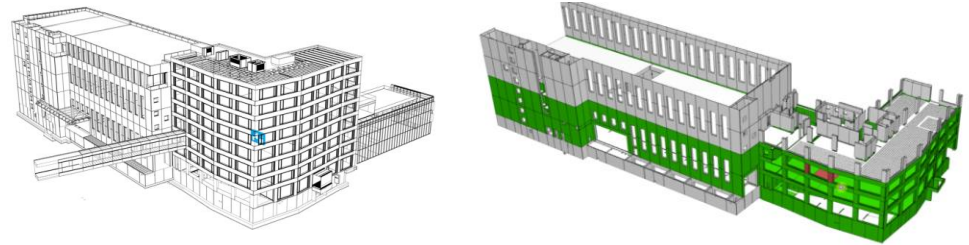
Way towards a digital factory



BIM Management

- Visualization of 3D-BIM Model
- Digital Twin for precast building
- Central status overview
- Import of BIM Data
- Milestone Planning
- Quantity take-off of raw materials

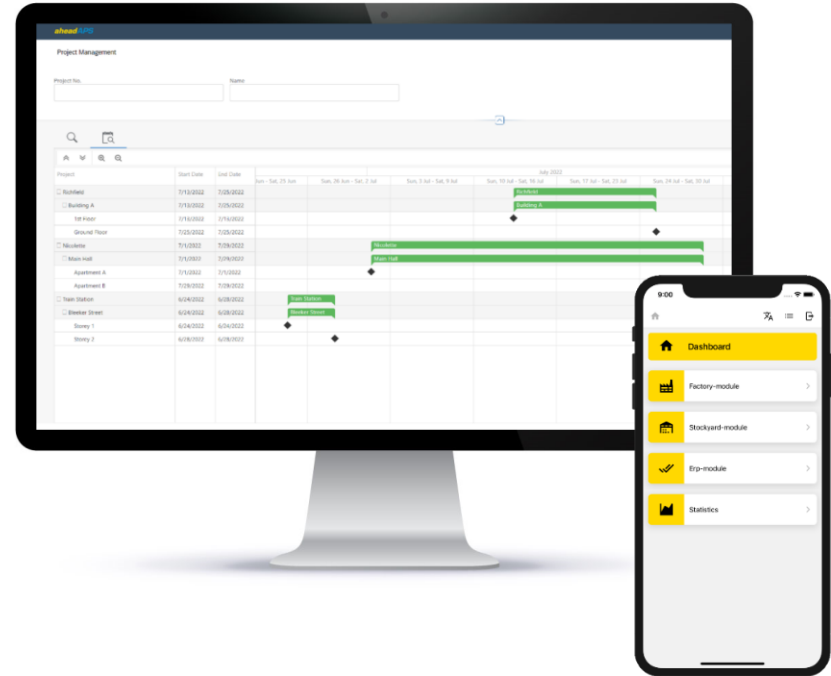
Model2Fabrication



Autodesk® Revit®

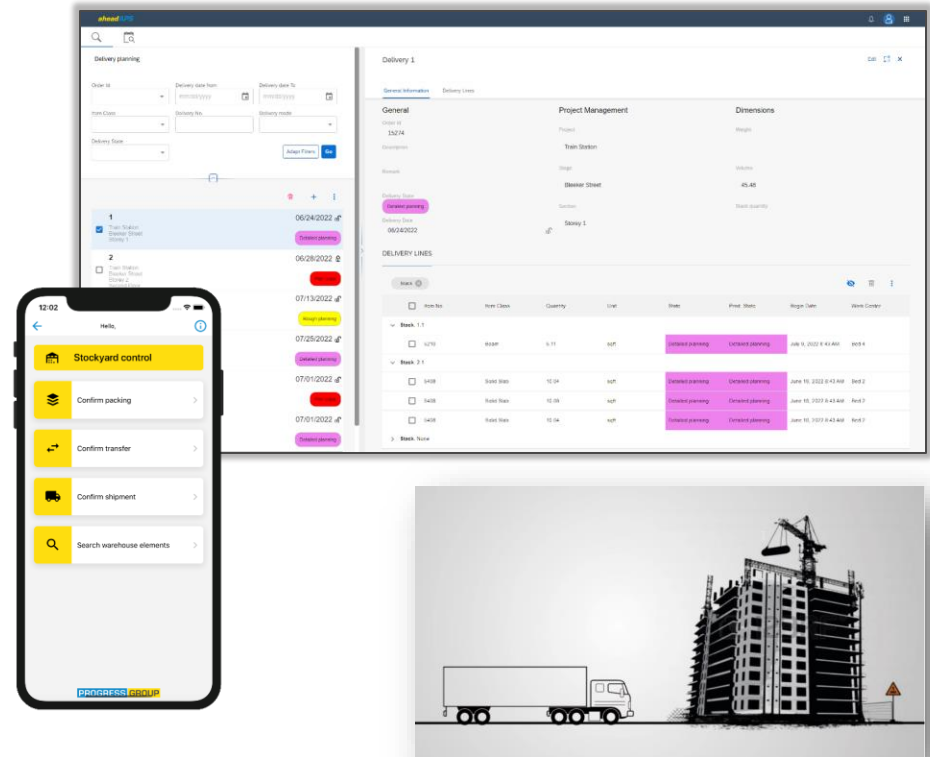
Project planning

- Central planning functionality
- Rough planning of deliveries
- Backward planning of production
- Delivery and production status overview
- Identification of critical path



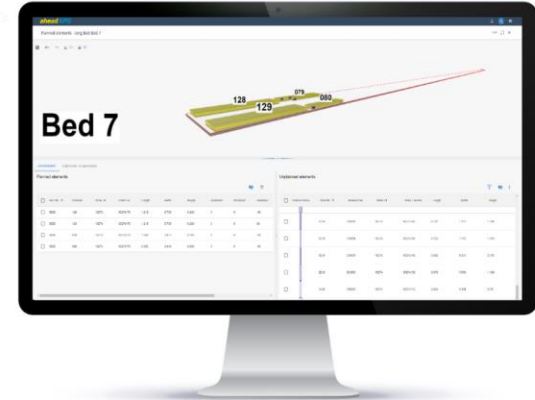
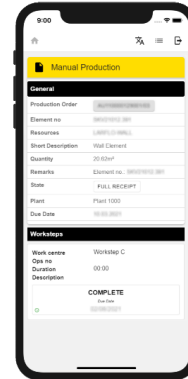
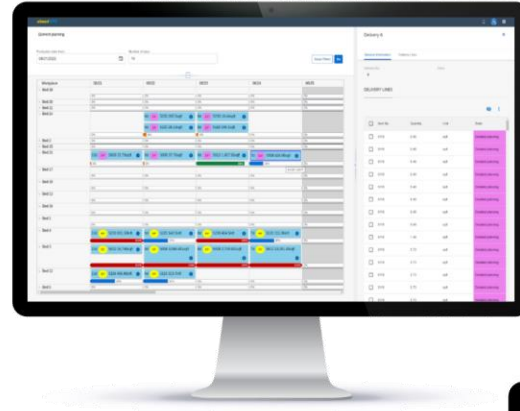
Delivery planning

- Cost efficient transportation planning
- Tracking of your shipment
- Mobile access on site
- Graphical state tracking
- Planning of Installation team



Production planning

- 3D - Planning of single workplaces
- Capacity overview
- Status tracking
- Work-Preparation
- Nesting optimization



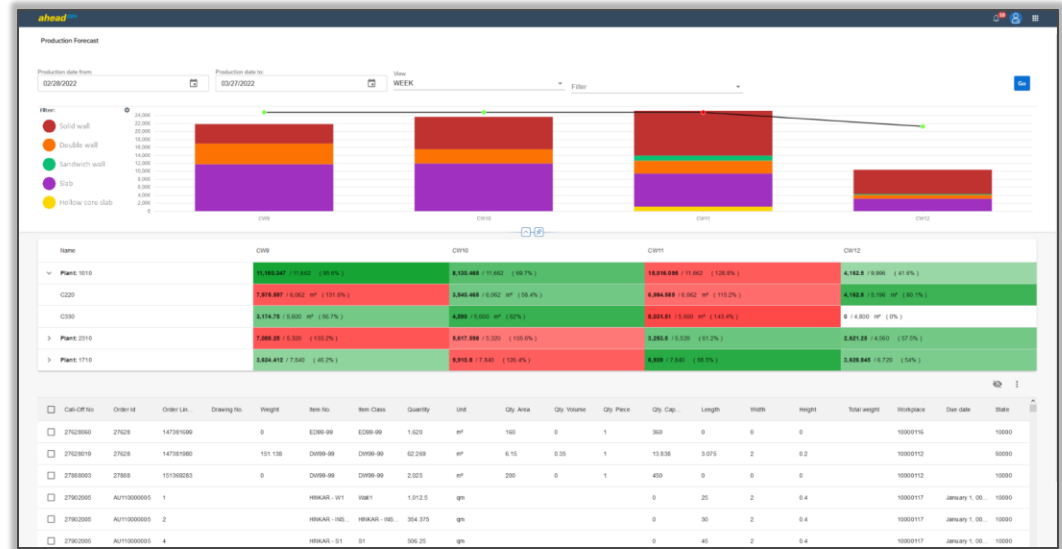
3D stacking

- 3D Stacking of elements
- Loading List preparation
- Handling of different transportation units



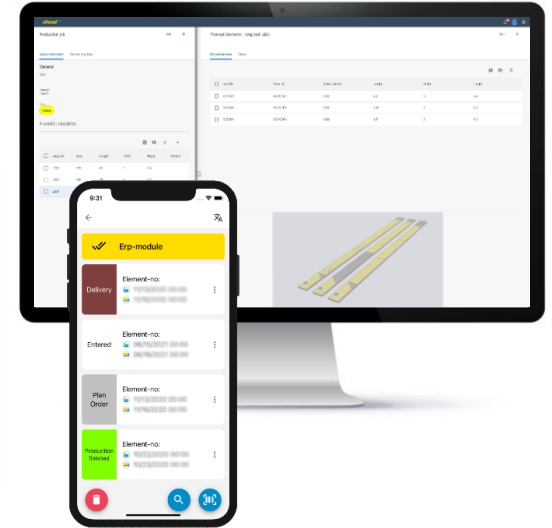
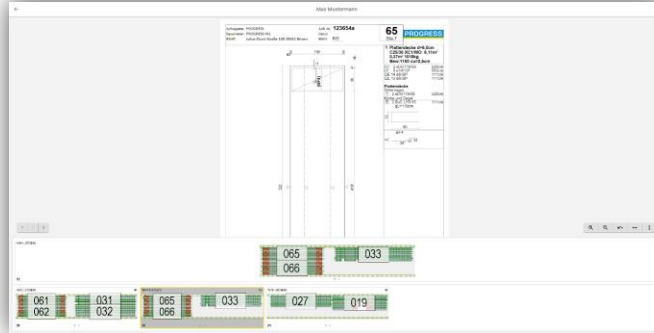
Capacity planning

- Graphical Capacity overview
- Workload for each work center
- Central planning function
- Identification of bottlenecks



Smart Production

- Get rid of paper in production
- Integration to 3rd party tools (ex: Plotter etc.)
- Mobile Application for Production, Logistics und Quality Control
- Quality Control
- Time registration
- Status Feedback

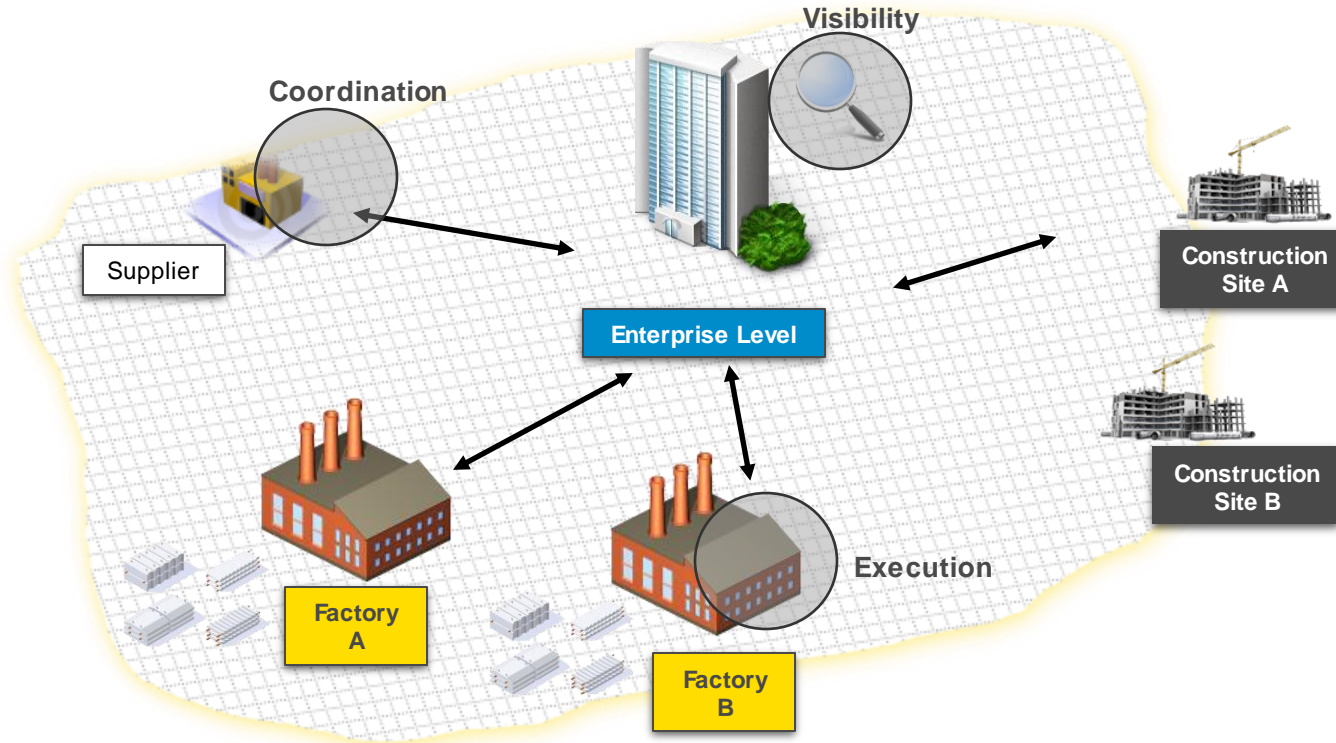


Learning Objective 4

Receive input that can help you benefit on your own with easy steps, without radical changes, and in less time than you thought

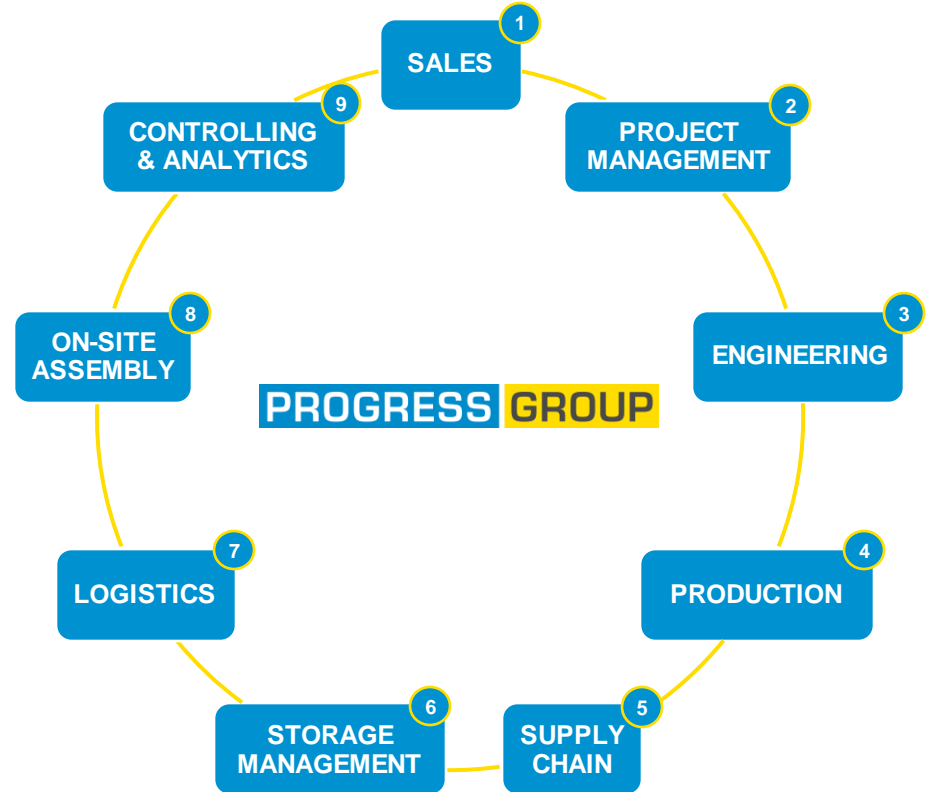
AMERICAN
PROGRESS GROUP

The perfect plant

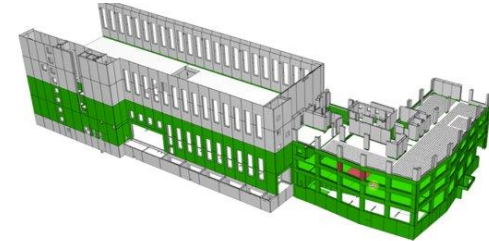
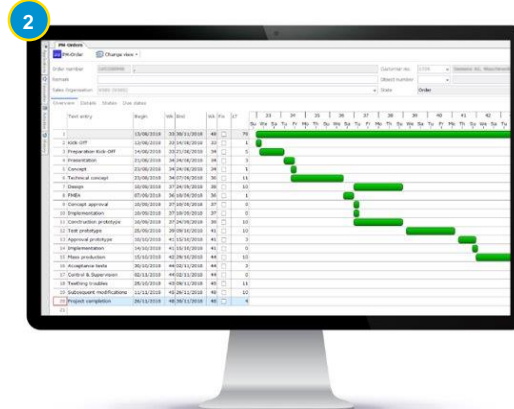
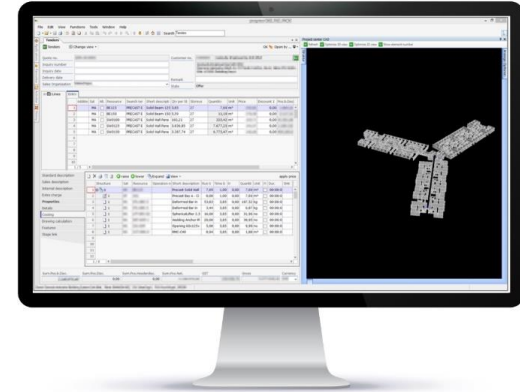
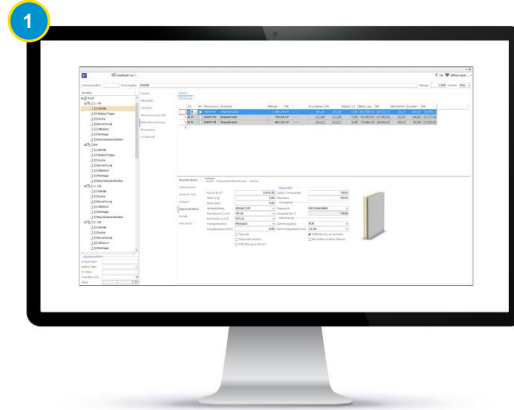


Business processes

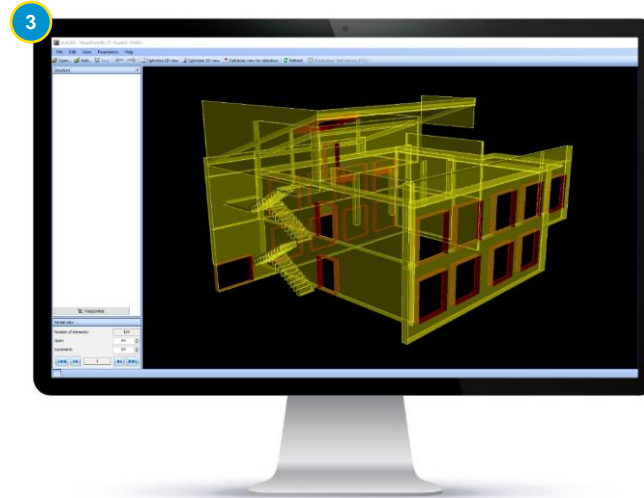
- PROGRESS GROUP provides an **open** ecosystem that works with other solutions and machinery equipment too.
- Clients are free to choose what fits them most although PROGRESS GROUP can provide most topics as one stop shop.



Sales & Project management



Engineering



Precast Software Engineering

Trimble® Tekla®

Autodesk® AutoCAD®

Autodesk® Revit®

Strusoft Impact

IDAT

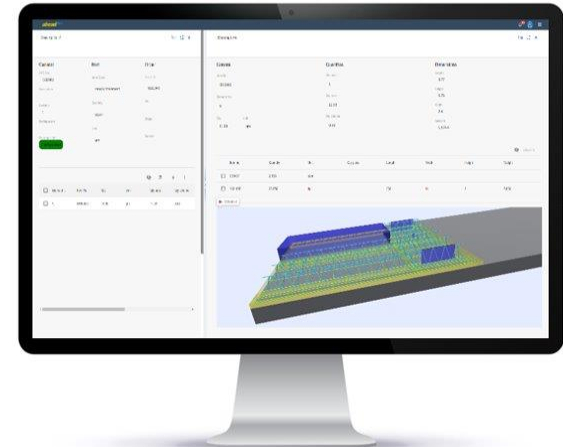
Matrix Software

PXML

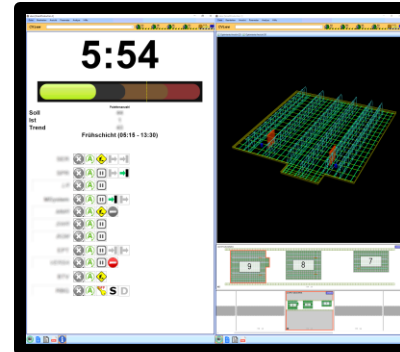
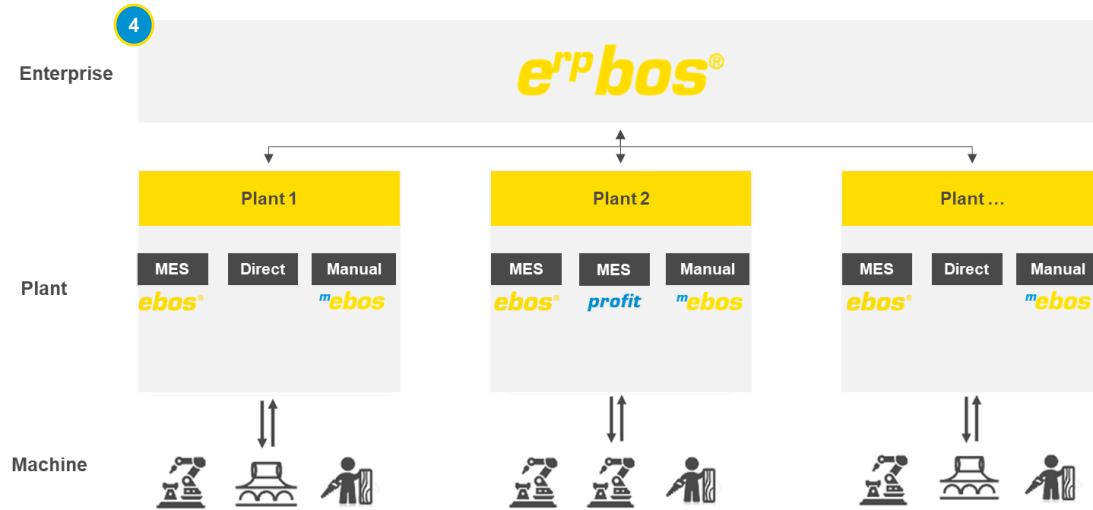
BVBS

UNITECHNIK

e²bos
ebos
profit



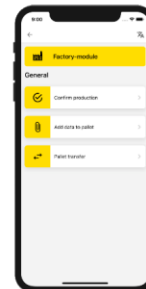
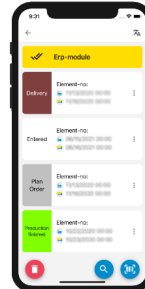
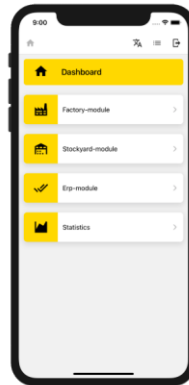
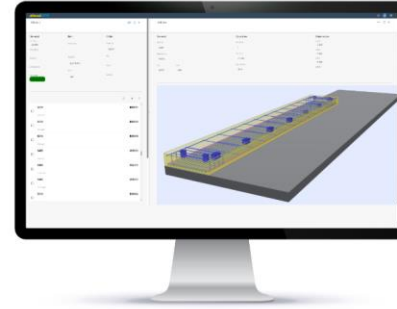
Production



Paperless production with
Dynamic Smart Production Cockpit

Production

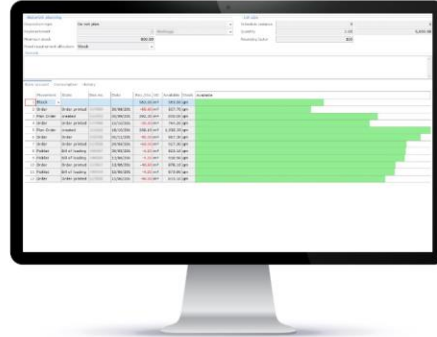
PROGRESS GROUP



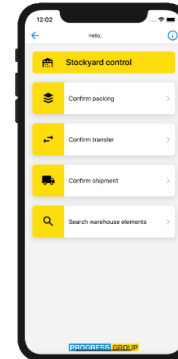
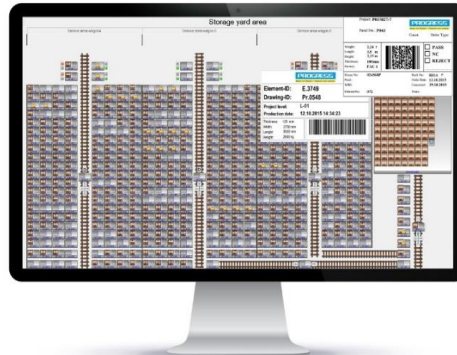
Supply chain & Storage management

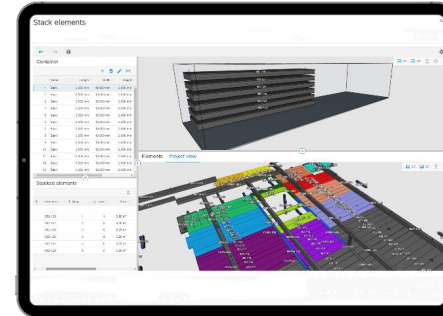


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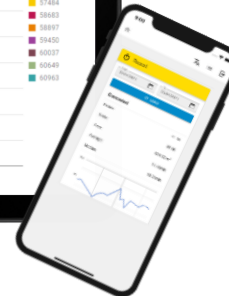


AUTODESK UNIVERSITY

Controlling & Analytics



9



Added values

- Creating digital platform with industry partner
- Industry solutions developed with industry specialists
- Integrated solutions → Everything from one source
- Integrated planning and management solution for all business and production processes

Carousel plant technology





End Presentation

Thank you



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